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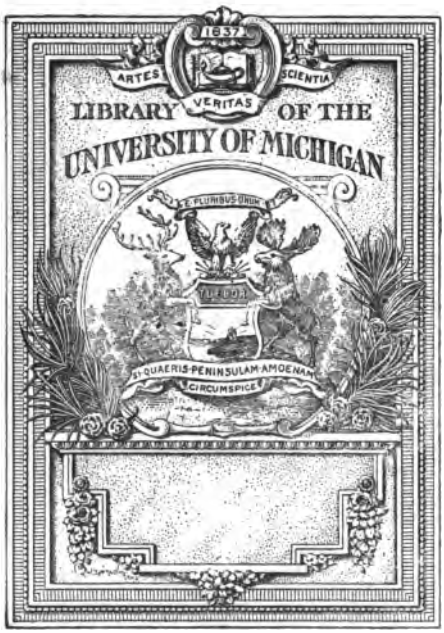

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FIRST

BIENNIAL REPORT

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF IOWA,

FOR THE

FISCAL PERIOD ENDING SEPT. 30, 1881.

DES MOINES:
F. M. MILLS, STATE PRINTER.
1882.

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Resolved, That the Board is in nowise responsible for the sentiments and opinions entertained in the following papers, prepared by special request of the Board, the respective author of each paper being responsible for its contents.—*Resolution adopted by the Board and ordered printed in the Biennial Report.*

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IOWA STATE BOARD OF HEALTH,
OFFICE OF SECRETARY,
DES MOINES, November 2, 1881.

To HON. J. H. GEAR, *Governor of Iowa:*

I HAVE the honor to herewith submit the report of the State Board of Health of Iowa, through its Secretary, R. J. Farquharson, M. D., from the organization of the Board, May 5th, 1880, to October 1st, 1881.

W. S. ROBERTSON, *President.*

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STATE OF IOWA,
OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
DES MOINES, November 1, 1881.

To JOHN H. GEAR, *Governor of Iowa:*

SIR—In accordance with the provisions of section 11, chapter 151, laws of Eighteenth General Assembly, the First Biennial Report of the State Board of Health, for the fiscal period ending September 30 1881, is herewith presented.

L. F. ANDREWS, *Secretary.*

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MEMBERS OF THE BOARD.

‡ WILLIAM S. ROBERTSON, Muscatine, President; term expires January 31, 1881.
WILMOT H. DICKINSON, Des Moines; term expires January 31, 1882.
GEORGE F. ROBERTS, Waterloo; term expires January 31, 1883.
JUSTIN M. HULL, Lake Mills; term expires Jaanuary 31, 1884.
PHILIP W. LEWELLEN, Clarinda; term expires January 31, 1885.
HENRY H. CLARK, McGregor; term expires January 31, 1886.
EPHRAIM M. REYNOLDS, Centerville; term expires January 31, 1887.
JAMES L. LORING, Dallas Center; term expires May 4, 1887.
* SMITH MCPHERSON, Attorney-general, *ex officio*.
L. F. ANDREWS, Secretary, Des Moines.
† R. J. FARQUARSON, Davenport.

* Succeeds J. F. McJunkin, whose term expired January 1, 1881.
† Succeeds L. F. Andrews, whose term expired May 5, 1881.
‡ Reappointed by the Governor, January 29, 1880; term expires January 31, 1886.

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LAW OF IOWA ESTABLISHING A STATE BOARD OF HEALTH.

CHAPTER 151.

AN ACT to establish a State Board of Health in the State of Iowa, to provide for collecting vital statistics, and to assign certain duties to local boards of health, and to punish neglect of duties.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That the Governor, with the approval of the Executive Council, shall appoint nine (9) persons, one of whom shall be the Attorney-general of the State (by virtue of his office), one a civil engineer, and seven (7) physicians, who shall constitute a State Board of Health. The persons so appointed shall hold their offices for seven (7) years: *Provided*, that the terms of office of the seven physicians first appointed shall be so arranged by lot that the term of one shall expire on the thirty-first (31st) day of January of each year; and the vacancies thus occasioned, as well as all other vacancies otherwise occurring, shall be filled by the Governor, with the approval of the Executive Council.

SEC. 2. The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of the State. They shall have charge of all matters pertaining to quarantine; they shall supervise a State registration of marriages, births and deaths, as hereinafter provided; they shall have authority to make such rules and regulations and such sanitary investigations as they may, from time to time, deem necessary for the preservation or improvement of the public health; and it shall be the duty of all police officers, sheriffs, constables, and all other officers of the State, to enforce such rules and regulations, so far as the efficiency and success of the Board may depend upon their official co-operation.

SEC. 4. The clerk of the district and circuit courts of each of the several counties in the State shall be required to keep separate books for the registration of the names and post-office address of physicians and midwives, for births, for marriages, and for deaths, which record shall show the names, date of birth, death or marriage; the names of parents and sex of the child, when a birth, and when a death, shall give the age, sex and cause of death, with the date of the record, and the name of the person furnishing the information. Said books shall always be open for inspection without fee; and the clerks of said courts shall be required to render a full and complete report of all births, marriages and deaths to the Secretary of the Board of Health annually, on the first day of October of each year, and at such other times as the Board may direct.

SEC. 4. It shall be the duty of the Board of Health to prepare such forms for the record of births, marriages, and deaths as they may deem proper; the said forms to be furnished by the Secretary of said Board to the clerks of the District and Circuit courts of the several counties, whose duty it shall be to furnish them to such persons as are herein required to make reports.

SEC. 5. It shall be the duty of all physicians and midwives in this State to register their names and post-office address with the clerk of the District and Circuit courts of the county where they reside; and said physicians and midwives shall be required, under penalty of ten dollars ($10), to be recovered in any court of competent jurisdiction in the State at suit of the clerk of the courts, to report to the clerk of the courts, within thirty (30) days from the date of their occurence, all births and deaths which may come under their supervision, with a certificate of the cause of the death, and such other facts as the Board may require, in the blank forms furnished, as hereinafter provided.

SEC. 6. When any birth or death shall take place, no physician or midwife being in attendance, the same shall be reported by the parent to the clerk of the District and Circuit courts within thirty (30) days from the date of its occurence, and if a death, the supposed cause of death, or, if there be no parent, by the nearest of kin not a minor, or, if none, by the resident householder where the birth or death shall

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have occurred, under penalty provided in the preceding section of this act. Clerks of the District and Circuit courts shall annually, on the first day of October of each year, send to the Secretary of the State Board of Health a statement of all births and deaths recorded in their offices for the year preceding said date, under a penalty of twenty-five dollars ($25) in case of failure.

SEC. 7. The coroners of the several counties shall report to the clerk of the courts all cases of death which may come under their supervision, with the cause or mode of death, etc., as per form furnished, under penalty as provided in section 5 of this act.

SEC. 8. All amounts recovered under the penalties of this act shall be appropriated to a special fund for carrying out the object of this law.

SEC. 9. The first meeting of the Board shall be within twenty days after its appointment, and thereafter in May and November of each year, and at such other times as the Board shall deem expedient. The November meeting shall be in the city of Des Moines. A majority of the members of the Board shall constitute a quorum. They shall choose one of the number to be President, and shall adopt rules and by-laws for their government, subject to the provisions of this act.

SEC. 10. They shall elect a Secretary, who shall perform the duties prescribed by the Board and by this act. He shall receive a salary, which shall be fixed by the Board, not exceeding $1,200 per annum. He shall, with the other members of the Board, receive actual traveling and other necessary expenses incurred in the performance of official duties; but no other member of the Board shall receive a salary. The President of the Board shall quarterly certify the amount due the Secretary, and on presentation of said certificate the Auditor of State shall draw his warrant on the State Treasurer *of* [for] the amount.

SEC. 11. It shall be the duty of the Board of Health to make a biennial report, through their Secretary or otherwise, in writing, to the Governor of the State, on or before the first (1st) day of December of each year preceding that in which the General Assembly meets, and such report shall include so much of the proceedings of the Board, such information concerning vital statistics, such knowledge respecting diseases, and such instruction on the subject of hygiene as may be thought useful by the Board, for dissemination among the people, with such suggestions as to legislative action as they may deem necessary.

SEC. 12. The sum of five thousand dollars ($5,000) per annum, or so much thereof as may be necessary, is hereby appropriated to pay the salary of the Secretary, meet the contingent expenses of the office of the Secretary and the expenses of the Board, and all costs of printing, which together shall not exceed the sum hereby appropriated. Said expenses shall be certified and paid in the same manner as the salary of the Secretary. The Secretary of State shall provide rooms suitable for the meetings of the Board and the office-room for the Secretary of the Board.

SEC. 13. The mayor and aldermen of each incorporated city, the mayor and council of any incorporated town or village in the State, or the trustees of any township, shall have and exercise all the powers and perform all the duties of a board of health within the limits of the cities, towns and townships of which they are officers.

SEC. 14. Every local board of health shall appoint a competent physician to the board, who shall be the health officer within its jurisdiction, and shall hold his office during the pleasure of the board. The clerks of the townships and the clerks and recorders of cities and towns shall be clerks of the local boards. The local boards shall also regulate all fees and charges of persons employed by them in the execution of the health laws and of their own regulations.

SEC. 15. It shall be the duty of the health physician of every incorporated town, and also the clerk of the local board of health in each city or incorporated town or village in the State, at least once a year to report to the State Board of Health their proceedings, and such other facts required, on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health.

SEC. 16. Local boards of health shall make such regulations respecting nuisances, sources of filth and causes of sickness within their jurisdiction and on board any boats in their ports or harbors as they shall judge necessary for the public health and safety; and if any person shall violate any such regulations, he shall forfeit a sum of not less than twenty-five dollars ($25) for every day during which he knowingly violates or disregards said rules and regulations, to be recovered before any justice of the peace or other court of competent jurisdiction.

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SEC. 17. The board of health of any city or incorporated town or village shall order the owner of any property, place or building (at his own expense) to remove any nuisance, source of filth or cause of sickness found on private property, within twenty-four (24) hours, or such other time as is deemed reasonable, after notice served as hereinafter provided; and if the owner or occupant neglects to do so, he shall forfeit a sum not exceeding twenty dollars ($20) for every day during which he knowingly and willfully permits such nuisance or cause of sickness to remain after the time prescribed for the removal thereof.

SEC. 18. If the owner or occupant fails to comply with such order, the board may cause the nuisance, source of filth or cause of sickness to be removed, and all expenses incurred thereby shall be paid by the owner, occupant or other person who caused or permitted the same, if he has had actual notice from the board of health of the existence thereof, to be recovered by civil action in the name of the State before any court having jurisdiction.

SEC. 19. The board, when satisfied upon due examination that any cellar, room, tenement, or buildiing in its town, occupied as a dwelling-place, has become, by reason of the number of occupants, or want of cleanliness, or other cause, unfit for such purpose, and a cause of nuisance or sickness to the occupants or the public, may issue a notice in writing to such occupants, or any of them, requiring the premises to be put in a proper condition as to cleanliness, or, if they see fit, requiring the occupants to remove or quit the premises within such time as the board may deem reasonable. If the persons so notified, or any of them, neglect or refuse to comply with the terms of the notice, the board may cause the premises to be properly cleaned at the expense of the owners, or may remove the occupants forcibly and close up the premises, and the same shall not again be occupied as a dwelling-place without permission in writing of the board.

SEC. 20. Whenever the board of health shall think it necessary for the preservation of the lives or health of the inhabitants to enter a place, building or vessel in their township, for the purpose of examining into and destroying, removing or preventing any nuisance, source of filth or cause of sickness, and shall be refused such entry, any member of the board may make complaint, under oath, to any justice of the peace of his county, whether such justice be a member of the board or not, stating the facts of the case, so far as he has knowledge thereof. Such justice shall thereupon issue a warrant, directed to the sheriff or any constable of the county, commanding him to take sufficient aid, and, being accompanied by two or more members of the said board of health, between the hours of sunrise and sunset, repair to the place where such nuisance, source of filth or cause of sickness complained of may be, and the same destroy, remove, or prevent, under the direction of such members of the board of health.

SEC. 21. When any person coming from abroad, or residing within any city, town or township within this State, shall be infected, or shall lately have been infected with small-pox, or other sickness dangerous to the public health, the board of health of the city, town or township where said person may be, shall make effectual provision, in the manner in which they shall judge best, for the safety of the inhabitants, by removing such sick or infected person to a separate house, if it can be done without damage to his health, and by providing nurses and other assistance and supplies, which shall be charged to the persom himself, his parents, or other person who may be liable for his support, if able; otherwise at the expense of the county to which he belongs.

SEC. 22. If any infected person cannot be removed without damage to his health, the board of health shall make provision for him, as directed in the preceding section, in the house in which he may be, and in such case they may cause the persons in the neighborhood to be removed, and may take such other measures as may be deemed necessary for the safety of the inhabitants.

SEC. 23. Any justice of the peace, on application under oath showing cause therefor by a local board, or any member thereof, shall issue his warrant under his hand, directed to the sheriff or any constable of the county, requiring him, under the direction of the board of health, to remove any person infected with contagious diseases, or to take possession of condemned houses and lodgings, and to provide nurses and attendants, and other necessaries for the care, safety and relief of the sick.

SEC. 21. When any person coming from abroad, or residing within any city, town or township within this State, shall be infected with small-pox, or other sickness dangerous to the public health, the board of health of the city, town or town-

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SEC. 22. If any infected person cannot be removed without damage to his health, the board of health shall make provision for him, as directed in the preceding section, in the house in which he may be, and in such case they may cause the persons in the neighborhood to be removed, and may take such other measures as may be deemed necessary for the safety of the inhabitants.

SEC. 23. Any justice of the peace, on application under oath showing cause therefor by a local board, or any member thereof, shall issue his warrant under his hand, directed to the sheriff or any constable of the county, requiring him, under the direction of the board of health, to remove any person infected with contagious diseases, or to take possession of condemned houses and lodgings, and to provide nurses and attendants, and other necessaries for the care, safety and relief of the sick.

SEC. 24. Local boards of health shall meet for the transaction of business on the first Monday of May and the first Monday in November of each year, and at any other time that the necessities of the health of their respective jurisdictions may demand; and the clerk of each board shall transmit his annual report to the Secretary of the State Board of Health within two weeks after the November meeting. Said report shall embrace a history of any epidemic disease which may have prevailed within his district. The failure of the clerk of the Board to prepare, or cause to be prepared, and forward such report as above specified, shall be considered a misdemeanor, for which he shall be subject to a fine of not more than twenty-five dollars ($25).

SEC. 25. All laws in conflict with this act are hereby repealed.

SEC. 26. This act, being deemed of immediate importance, shall take effect and be in force from and after its passage, and publication in the *Iowa State Register* and *Iowa State Leader*, newspapers published at Des Moines, Iowa.

Approved, March 26, 1880.

I hereby certify that the foregoing act was published in the *Iowa State Leader*, April 1, and in the *Iowa State Register*, April 3, 1880.

J. A. T. HULL, *Secretary of State.*

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ERRATA.

Wayne county should be added to counties in the Southern Division, on page 79.
The title of Central Division should appear over Marshall county, on page 117.
On page 79 the total population of the Northwestern Division should be 53,655.

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SECRETARY'S REPORT.

PURSUANT to chapter 151, laws of the Eighteenth General Assembly, the Governor, on the twenty-third day of April, A. D., 1880, commissioned the following persons to constitute the State Board of Health:

WILLIAM S. ROBERTSON, M. D.....MUSCATINE.
PHILLIP W. LEWELLEN, M. D.....CLARINDA.
WILMOT H. DICKINSON, M. D.....DES MOINES.
HENRY H. CLARK, M. D.....McGREGOR.
JUSTIN M. HULL, M. D.....LAKE MILLS.
EPHRAIM M. REYNOLDS, M. D.....CENTERVILLE.
GEORGE F. ROBERTS, M. D.....WATERLOO.
JAMES L. LORING, *Civil Engineer*.....DALLAS CENTER.
JOHN F. McJUNKIN, *Attorney-general*.....WASHINGTON.

MEETING OF THE BOARD.

The first meeting of the Board was held at the State-house in Des Moines, May 5, 1880. The following members were present: Dr. W. S. Robertson, Dr. P. W. Lewellen, Dr. W. H. Dickinson, Dr. H. H. Clark, Dr. J. M. Hull, Dr. E. M. Reynolds, Dr. G. F. Roberts, J. F. McJunkin, Attorney-general, and James L. Loring, Civil Engineer.

A temporary organization was perfected by the election of Dr. Lewellen, Chairman, and Dr. Roberts, Secretary, when the following persons were elected permanent officers:

PRESIDENT—W. S. Robertson, M.D.
VICE PRESIDENT, *pro tem.*—W. H. Dickinson, M. D.
SECRETARY.—L. F. Andrews.

Pursuant to the statute, the Board by lot arranged the terms of the members as follows; to-wit,

DR. ROBERTSON.....*One year.*
DR. DICKINSON.....*Two years.*
DR. ROBERTS.....*Three years.*
DR. HULL.....*Four years.*
DR. LEWELLEN.....*Five years.*
DR. CLARK.....*Six years.*
DR. REYNOLDS.....*Seven years.*

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Dr. Robertson, on taking the chair as permanent President, addressed the Board as follows:

PRESIDENT'S INTRODUCTORY ADDRESS.

Gentlemen—We have come together at the call of the Governor for the purpose of organizing a "State Board of Health," as provided for in chapter 151, of the acts of the Eighteenth General Assembly of the State of Iowa.

It is a subject of gratulation that the last legislature has placed our State abreast of so many of her sister States on the great work of sanitary progress, by creating a State Board of Health, which may inaugurate such measures as will materially limit the spread, and reduce the mortality of many of the diseases of the country; and, if necessary, enforce such sanitary regulations as will largely stamp out those influences which become prolific casuses of disease.

Nor, can I conceive of any office which as physicians could afford us more pleasure, and result in more good to the masses of our people than will be derived from the operation of this Board.

It is an old proverb that "forewarned is forearmed." It shall then become our duty to do much toward educating the people in the principles of hygiene and sanitary reform; to show them something of the nature and many of the causes of disease, and to impress them with the knowledge of the fact that in their manner of life, and in their every day surroundings, lie many of the means of inducing or preventing the encroachments of disease.

For the purpose of putting into efficient operation this great work, you are "called from the bed side into the broad field of sanitary labor, to consider those interests that are general and vital" to the citizens of Iowa. Let it be our endeavor, by wise and timely suggestions, to so mould popular opinion, and so instruct the masses in the elements of sanitary science, that all may recognize the wisdom of the enactment of the Health Law, and the operations of this Board as a philanthropic measure, which shall give them purer water, better drainage, better ventilated homes, more healthy food and longer life, as well as adding to their revenue the money hitherto spent in fruitless attempts to ward off disease, under a misconception of its nature and causes.

I am much inclined to believe that a large percentage of the disease of many parts of Iowa is directly or indirectly traceable to impure water supply, hence to a certain degree preventable by properly conducted sanitation. The United States census report for 1870 shows that the mortality was 492,263. "One-half of the total number of deaths were caused by the diseases due, for the most part, to miasms consequent upon soil saturation and stagnant water. More than 75,000 lives might have been saved by drainage."

The character of food, and its modes of preparation offers another important element of health-derangement.

Improper ventilation of living and sleeping apartments, and of school buildings, each and all claim annually a larger proportion of deaths than the masses are ready to acknowledge. Let us, then, on the very threshold of our labor, arrange carefully its details. Fully impressed with the responsibility of our commission, bringing to

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our work willing hands, and a full appreciation of its benefits, we will inaugurate a movement of incalculable benefit to the State, ere the time comes for our biennial report.

The experience of other health boards demonstrates that the work of its members is best accomplished by the appointment of standing committees on the general subjects demanding their attention. Each member selecting such subjects as are congenial to his tastes and habits of inquiry. The board thus "maps out for itself separate and distinct departments" of labor.

It is desirable that we secure the co-operation of local boards of health, as well as the services of individual scientists throughout the State, studying and investigating, as they are, so many of the subjects germane to our interest. Thus may we not only secure many valuable facts and statistics for our own use, but gain valuable media through which we may impart information to the people for the general good.

The last decade has made stalwart strides in the enlightenment of the masses in sanitary matters. Water supply, ventilation, drainage and miasm have become household words, and while perhaps not appreciated in their widest significance, they are the straws which show the direction of the popular current of thought, and are indices that the popular mind is reaching out for facts, and is grasping the progressive ideas which underlie so many of the important questions of public health.

When the people learn that many of the diseases of the country may be prevented, and the mortality lists materially abridged by the operations of this State Board of Health, they will seek further light, from all available sources, on subjects in which they feel so deep personal interest.

We can not overestimate the value and importance of popular lectures by members of this Board in different parts of the State, the discussion of the value of pure drinking water and the many contaminations of the water supply, the adulteration of food, geological formation, drainage and many kindred subjects, in which all classes of people feel an interest. The press will be only too happy to offer their columns for such information to their readers, from writers of acknowledged ability, whether members of this Board or otherwise; and we trust the Board will write all such persons who feel an interest in sanitary progress to give us such co-operation.

While it is probable that at our first meeting we shall be able to do little more than organize our Board and prepare a plan of operation, I suggest the subject of "Vital Statistics" receive early attention, inasmuch as such information must to a large extent be the basis of our operations. If we are not possessed of knowledge of the diseases and mortality of the State, we shall be ignorant as to whether we are or are not accomplishing any good.

Circulars and forms should be sent to the clerks of the courts of the different counties at the earliest moment and books opened for the "registration of physicians and midwives" of the State; also of "marriages, births and deaths," as contemplated in "section 3, of the act creating the State Board of Health."

The medical profession throughout the State will be so ready to co-operate in this work that it will be only necessary for the Secretary of the Board to invite

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them to furnish any information in their possession—direct or indirect—regarding the diseases of their several localities, as to insure hearty and intelligent responses, since such information will form a stock—so to speak—which will be utilized for the prevention of disease and the reduction of the mortality lists.

In conclusion, gentlemen, let me express the hope that the operation of this Board in the sanitary measures it may inaugurate and carry out, may so demonstrate the wisdom of its creation that it may prove a blessing to the whole State, and that, with advancing years it may develop a strength and influence for good which shall make Iowa one of the most salubrious, as it is one of the most prosperous, States of our confederation.

VITAL STATISTICS.

The subject of vital statistics was discussed at length, and special committees were appointed to prepare the necessary forms, for Register of births, marriages, deaths, still births, physicians and midwives, for the use of clerks of the District and Circuit Courts; also forms for returns of births, marriages, deaths, and still births, to be made by physicians, midwives, coroners, and those solemnizing marriages, to the clerk of the courts; also for records and reports of health physicians and clerks of local boards of health to the State Board of Health, of diseases dangerous to the public health.

These committees reported to the Board the result of their labor, and the following forms were adopted:

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[FORM 12D.] REGISTER OF BIRTHS.

No.	Date of return.	1. Name of child. 2. Sex. 3. No. of child of this mother.	Race or color.	1. Date of birth. 2. Place of birth.	1. Nationality of father. 2. Place of birth.	Age.
		1 2 3		1 2	1 2	

1. Nationality of mother. 2. Place of birth.	Age.	1. Full name of mother. 2. Maiden name of mother. 3. Residence of mother.	1. Full name of father. 2. Occupation.	1. Name and address of medical attendant. 2. Name and address of person making certificate. 3. Returned by.
1 2		1 2 3	1 2	1 2 3

[FORM 18D.] REGISTER OF MARRIAGES.

1. No. of license. 2. Date of license.	1. By whom affidavit, if any, is made. 2. By whom consent to marriage given.	1. Full name of groom. 2. Place of residence. 3. Occupation.	1. Age next birthday. 2. Race or color. 3. Place of birth.	1. Father's name. 2. Mother's maiden name. 3. No. of groom's marriage.
1 2	1 2	1 2 3	1 years. 2 3	1 2 3

1. Full name of bride. 2. Maiden name, if a widow. 3. Place of residence.	1. Age next birthday. 2. Race or color. 3. Place of birth.	1. Father's name. 2. Mother's maiden name. 3. No. of bride's marriage.	1. Where and when married. 2. Witnesses. 3. By whom certified, name and office.	1. Date of return. 2. When registered.
1 2 3	1 years. 2 3	1 2 3	1 at 2 18 3	1 2

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[Form 13D.] REGISTER OF DEATHS.

No.	Date of report.	1. Name. 2. Sex and color.	1. Age. 2. Occupation.	Date of death. Month.	Day.	Year.	A. M. or P. M.	Single, married, widower or widow.	1. Nationality. 2. Where born.
		1 2 sex, color,	1 year, month, days. 2						1 2

How long resident in this State. Years.	1. Place of death. 2. Cause of death.	1. Complication. 2. Duration of disease.	1. Place of burial. 2. Date of burial.	Name and residence of physician returning certificate.
	1 2	1 2	1 2	

[Form 15D.] REGISTER OF STILL-BIRTHS.

No.	Date of return.	1. Name of mother. 2. Residence of mother. 3. Nativity of mother.	1. Name of father. 2. Nativity of father.	1. Sex. 2. Color.
		1 2 3	1 2	1 2

1. Date of birth. 2. Place of birth. 3. Place of burial.	1. Period of utero-gestation. 2. Cause of dead-birth.	1. Name and residence of medical attendant. 2. Name and residence of person making return.
1 2 3	1 2	1 2

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[FORM 14D.] REGISTER OF PHYSICIANS AND MIDWIVES, ... COUNTY, IOWA.

When registered.	Name. The signature of party is required.	School of practice.	Residence and P. O. address. Give St. and No. if in city or town.	Age.	Nativity.

No. of years in practice.	No. of years in practice in Iowa.	Name of medical college.	Date of graduation.	Remarks.

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[FORM 13.] RETURN OF A BIRTH.

STATE OF IOWA, } The physician, midwife or person in attendance should immediately return this certificate, accurately filled out, to the county clerk. Penalty, $10, if not so certified and returned within 30 days.
..... County. }

STATE BOARD OF HEALTH.

1. Full name of child (if any)*.....
2. Sex.....No. of child of this mother.....
3. Race or color (if not of the white race).....
4. Date and place of birth†.....
5. Nationality, place of birth and age of each parent.....
6. Full name of mother and maiden name.....Mother's residence.....
7. Full name of father.....
8. Father's occupation.....
9. Name of medical or other attendant and address.....

Returned by.....M. D.....
Dated at.....18 .....Residence.....

(Chapter 151, Acts Eighteenth General Assembly.)

SEC. 2. POWERS OF THE BOARD.—The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of the State. They shall supervise a state registration of marriages, births and deaths, as hereinafter provided; they shall have authority to make such rules and regulations as they may, from time to time, deem necessary for the preservation and improvement of the public health.

SEC. 5. DUTY OF PHYSICIANS.—It shall be the duty of physicians and midwives in this State to register their names and post-office address with the clerk of the District and Circuit courts of the county where they reside; and said physicians and midwives shall be required, under penalty of ten dollars ($10), to be recovered in any court of competent jurisdiction in the State at suit of the clerk of the courts, to report to the clerk of the courts within thirty (30) days from the date of their occurrence, all births and deaths which may come under their supervision, with a certificate of the cause of death, and such other facts as the Board may require, in the blank forms furnished, as hereinafter provided.

SEC. 6. REPORT OF BIRTHS OR DEATHS.—When any birth or death shall take place, no physician or midwife being in attendance, the same shall be reported by the parent to the clerk of the District and Circuit courts within thirty (30) days from the date of its occurrence, and if a death, the supposed cause of death, or if there be no parent, by the nearest of kin not a minor, or, if none, by the resident householder where the birth or death shall have occurred, under penalty provided in the preceding section of this act.

[FORM 2E.] RETURN OF A MARRIAGE.

1. Full name of groom.....
2. Place of residence.....
3. Occupation.....
4. Age next birthday.....years. Color.....race.....
5. Place of birth .....
6. Father's name.....
7. Mother's maiden name.... .
8. Number of groom's marriage.....
9. Full name of bride.....
   Maiden name, if a widow,.....
10. Place of residence .....
11. Age next birthday .....years. Color ..... race.....
12. Place of birth .....
13. Father's name .....

*The given name of child should be certified, if possible, when this certificate is made, and should, in any case, be certified, and registered within a year.
†City, number, street and ward, same in towns that have them; township or precinct.

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14. Mother's maiden name .....
15. No. of bride's marriage .....
16. Married at .....in the county of .....and State of Iowa, the..... day of .....18 .
17. Witnesses to marriage .....

N. B.—At Nos. 8 and 15 state whether 1st, 2d, 3d, 4th, etc., marriage of each. At 17 give names of subscribing witnesses to the marriage certificate. If no witnesses, give names of two persons who witnessed the ceremony.

.....18 .

We hereby certify that the information above given is correct, to the best of our knowledge and belief.

.....(Groom.)
.....(Bride.)

I hereby certify that the above is a correct return of a marriage solemnized by me.

Dated at .....
this .....day of .....18 . } .....

.....

☞This return is to be carefully filled out and attached to and returned with the marriage license. This return does not take the place of the certificate which comes attached to the license, but is in addition thereto.

(Chapter 151, Laws, 1880.)

SEC. 2. The State Board of Health shall have the general supervision of the interests of the health and life of the citizens. They shall supervise a state registration of marriages, births and deaths.

SEC. 4. It shall be the duty of the Board of Health to prepare such forms for the record of births, marriages and deaths as they may deem proper.

(Code of 1873.)

SEC. 2196. The person solemnizing marriage shall forfeit a like amount (fifty dollars) unless within ninety days after the ceremony he make return thereof to the clerk of the Circuit Court.

[FORM 4E.] PHYSICIAN'S CERTIFICATE OF DEATH.

STATE OF IOWA, } ☞The physician who attended any person in a last illness
} should immediately return this certificate, accurately filled out to
.....County. } the county clerk. Penalty $10, if not returned within 30 days.

STATE BOARD OF HEALTH.

1. Name ..... Sex ..... Color .....
2. Age .....years .....month .....days. Occupation .....
3. Date of death.....188 .....hour.....M.....*Single, married, widower, widow .....
4. Nationality and place where born.....
5. How long resident in this State.....
6. Place of death†.....
7. Cause of death‡..... | Complication.....
..... | .....
..... | Duration of complication.
8. Duration of disease.....
9. Place and date of burial.....

Dated at.....188 .....M. D.
Residence.....

The attention of physicians is earnestly invited to the following list of diseases, in reference to which the particulars specified are essential to the *proper classifica-*

*Erase such of these as are not required.
†City—No., street and ward; same in towns that have them; township or precinct.
‡State primary and immediate cause of death, and examine the list of diseases printed on cover of this book, and law pertaining to coroner's inquests.

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tion of the causes of death, and consequently to the *accuracy* and *usefulness* of our statistics of mortality. It is respectfully suggested that a *negative* statement is often as important as a positive one—for instance: "ABORTION—*At two months*—METRITIS—*No cause discoverable.*" "CANCER OF STOMACH—*Not hereditary so far as known.*" "ERYSIPELAS OF HEAD—*Not of traumatic origin.*" "GANGRENE OF LEG—*No definite cause.*" "METRITIS—*Not puerperal.*" "SMALL-POX—*Patient never vaccinated.*" "OVARIAN TUMOR—*No operation,*" etc.

Abscess—Location and cause, if any.
†*Aneurism*—Vessel involved, and mode of death. Whether operation.
**Abortion and Miscarriage*—Cause, mode of death, and period of gestation.
Cerebro-Spinal Meningitis—Variety, whether probably zymotic (cerebro-spinal fever), or a simple inflammation.
Childbirth—Circumstances producing death.
Cancer—Variety and seat; whether hereditary or not.
†*Calculus*—Mode of death; whether after operation, and if so, what one.
Carbuncle—Location.
Congestive Fever—Variety.
Continued Fever—Whether simple continued fever or other variety.
Convulsions—Cause of.
Dentition—Mode of death.
Disease of Heart—Variety. Valves involved, if any.
Dropsy—Variety and cause.
Enteritis and Gastro-Enteritis—Cause, if known. Whether diarrhœal or not.
**Erysipelas*—Seat and cause. If traumatic, how produced.
**Fractures*—Cause and mode of death. (State nature of accident, etc., clearly.)
**Gangrene*—Seat and cause.
Gastric Fever—Whether remittent, typhoid, etc., or simply gastritis.
Gastritis—Whether simple, or from a definite cause.
†*Hernia*—Variety and mode of death. Whether any operation.
Insanity—Variety and mode of death.
Intermittent Fever—Variety; as quotidian, tertian, etc.
Jaundice—Cause.
Malarial Fever—Variety.
Malignant Pustule—Location and cause. Whether probably dependent on contagion or not.
Malformation (congenital)—Variety.
Metritis—Variety and cause (whether puerperal or not).
Necrosis and Caries—Seat, original cause, and mode of death.
†*Ovarian Tumor*—Mode of death. Whether operation.
Paralysis—Variety and cause.
**Peritonitis*—Variety—Whether simple, puerperal, etc.; and if the last how produced.
Phlebitis—Cause, seat and variety.
**Pyœmia*—Cause, nature of antecedent injury, if any, and how produced.
**Premature Birth*—Probable cause. Fœtal age.
Preternatural or abnormal birth—Manner of.
Small-pox—How often and when patient vaccinated, or if never.
Syphilis—Variety, chief location, and mode of death.
**Tetanus*—Whether idiophatic or traumatic. Nature of antecedent injury, if any, and how produced.
†*Tumors*—Location, variety and mode of death. Whether operation.
Ulcers—Nature, chief location and mode of death.
Uraemia—Cause of associate affection. Whether puerperal.
**Wounds*—Cause, variety, seat, and mode of death.

Mention INTEMPERANCE whenever recognized as having produced or complicated the direct cause of death. Give as many particulars as possible in instances of rare diseases, such as hydrophobia, glanders, etc.

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*Particularize any *accident or other violent cause* leading to death and *character of injury.*

†Specify *every surgical operation* with fatal results, and state the disease which necessitated it.

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(Chapter 151, Acts Eighteenth General Assembly.)

SEC. 5. It shall be the duty of physicians and midwives in this State to register their names and post-office address with the clerk of the District and Circuit courts of the county where they reside; and said physicians and midwives shall be required, under penalty of ten dollars ($10), to be recovered in any court of competent jurisdiction in the State at suit of the clerk of the courts within thirty (30) days from the date of their occurrence, all births and deaths which may come under their supervision, with a certificate of the cause of death, and such other facts as the board may require, in the blank forms furnished, as hereinafter provided.

SEC. 6. When any birth or death shall take place, no physician or midwife being in attendance, the same shall be reported by the parent to the clerk of the District and Circuit courts within thirty (30) days from the date of its occurrence, and if a death, the supposed cause of death, or if there be no parent, by the nearest of kin not a minor, or, if none, by the resident householder where the birth or death shall have occurred, under penalty provided in the preceding section of this act.

[FORM 5E.] CORONER'S CERTIFICATE OF DEATH.

STATE OF IOWA, } The coroner should immediately return this certificate, accurately filled out, to the county clerk. Penalty, $10, if not returned within 30 days. The law applies, also, to justices, when acting as coroner.
.....County. }

STATE BOARD OF HEALTH.

1. Name.....sex.....color.....
2. Age. ..year....months....days. Occupation.....
3. Date of death.....hour....M., *single, married, widower, widow .....
4. Nationality and place where born.....
5. How long resident in this State.....
6. Place of death†.....
7. Cause of death‡.....
8. Place and date of burial§
9. Name and place of undertaker.....

Dated at.....18 . .....Coroner
Residence..... ...

(Chapter 151, Acts Eighteenth General Assembly.)

SEC. 7. The coroners of the several counties shall report to the clerk of the courts all cases of death which may come under their supervision, with the cause or mode of death, as per form furnished, within 30 days, under penalty of $10. This law applies also to justices of the peace, when acting as coroner.

[FORM 3E.] RETURN OF STILL-BIRTH.

STATE OF IOWA, } STATE BOARD OF HEALTH.
.....County. }

The death of an infant that has breathed must not be returned as a still-birth; such deaths should be certified in the usual manner, after returning the birth record.

Name of mother.....
Name of father.....
Place of birth.....
Residence of mother.....
Period of utero-gestation.....date of this birth.....
Sex.....color.....nativity of mother.....of father.....
Cause of dead-birth (if known).....
Signature of medical attendant.....
Residence of medical attendant.....
Name of other person making this return.....
Residence of other person making this return.....
Date.....188
Place of burial..... .....M. D.
Residence.....

*Erase such of these as are not required.
†City—No., street and ward; same in towns that have them; township or precinct.
‡State immediate cause of death, and examine the law pertaining to coroner's inquests.
§If delivered to friends, state as the facts may be.

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[FORM 20D.] RECORD OF CASES OF DISEASES DANGEROUS TO THE PUBLIC HEALTH.

Which have occurred in the.....of.....county of. .....State of Iowa.

Record number.	Received for record.			Full name of patient.	Sex.	Age in years last birthday.	Name of disease.
	Month.	Day.	Year.				

Taken sick.			Whether died, living or recovered.	Date of death or recovery.			Persons who furnished the facts for record.	
Month.	Day.	Year.		Month.	Day.	Year.	Name.	P. O. address.

The reported source of contagion or infection, in each case, was as follows: For the case recorded as No.....

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[FORM 2C.] REPORT OF CLERK OF LOCAL BOARD TO THE SECRETARY OF THE STATE BOARD OF HEALTH.

Sir: The following is a report consisting of a copy of the records of cases of diseases dangerous to the public health which have occurred in the.....of..... county of.....State of Iowa.

Record number.	Received for record.			Full name of patient.	Sex.	Age in years last birthday.	Name of disease.
	Month.	Day.	Year.				

Taken sick.			Whether died, living or recovered.	Date of death or recovery.			Persons who furnished the facts for record.	
Month.	Day.	Year.		Month.	Day.	Year.	Name.	P. O. address.

The reported source of contagion or infection. in each case, was as follows: For the case recorded as No.....it was. .....
I hereby certify that the above report of cases of diseases dangerous to the public health is a correct transcript from the records of this office
Dated at.....188 . (Official signature.).....

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[FORM 10.] REPORT OF HEALTH PHYSICIAN OF LOCAL BOARD.

[Before filling any blanks, please read carefully through the entire form, including foot-notes and instructions.]

☞DO NOT CHANGE OR MARK OUT ANY PRINTED MATTER.☜

To the Secretary of the State Board of Health: *Sir:*—This annual report to the State Board of Health by the health officer of the*.....of.....county of .....State of Iowa, for the year ending October 31, 1880, consists of this form, with[a].....a report of cases of diseases dangerous to the public health,† which have occurred in this*.....during the year above stated which is[b].....sent herewith on.....separate sheet....

1. To the best of my knowledge and belief, the ratio of deaths (from all causes) to inhabitants in this*.....during the year ending October 31, 1880, was[c] .....than the average of previous years.

2. The[d].....of the death-rate was probably due to:... ...

3. I estimate the number of inhabitants in this*.....at[e].....; and the number of deaths from all causes at[e].....

4. The per cent of deaths to inhabitants, during the year ending October 31, 1880, was.....

5. Compared with previous years, the ratio of cases of sickness (from all causes) to inhabitants in this*.....during the year ending October 31, 1880, was[c] .....than the average.

6. The[d].....of the proportion of sickness was probably due to.....

7. The greatest number of the deaths was from the diseases or causes (named in the order of greatest number) as follows:.....

8. The greatest number of cases of sickness was from diseases (named in the order of greatest prevalence), as follows:.....

9. The number of deaths during the year ending October 31, 1880, from disease dangerous to the public health† is as follows:‡

From small-pox.....deaths; From whooping-cough.....deaths;
From cholera.....deaths; From cerebro-spinal meningitis .deaths;
From scarlet fever.....deaths; From diphtheria.....deaths;
From typhoid fever.....deaths; From.....deaths;
From measles.....deaths;

10. To the best of my knowledge and belief, cases of diseases dangerous to the public health† have occurred within the jurisdiction of this board, during the year ending October 31, 1880, that have not been reported to me by the *Householder* within whose family the case occurred, or by the physician in charge of said case, as follows:‡ (*These cases are included in the statement in paragraph 12 below.*)

Of small-pox.....cases; Of whooping-cough.....cases;
Of cholera.....cases; Of cerebro-spinal meningitis .....cases;
Of scarlet fever.....cases; Of diphtheria.....cases;
Of typhoid fever.....cases; Of .....cases;
Of measles.....cases;

11. The numbers of cases of diseases on my record, which I report at this time in detail on the blank for that purpose, are as follows:‡

Of small-pox.....cases; Of whooping cough .....cases;
Of cholera.....cases; Of cerebro-spinal meningitis .....cases;
Of scarlet fever.....cases; Of diphtheria.....cases;
Of typhoid fever.....cases; Of .....cases;
Of measles.....cases;

12. Including the cases legally reported to me and those not so reported, the total number of cases of diseases dangerous to the public health,† which have occurred within the jurisdiction of this board, during the year ending October 31, 1880, were, to the best of my knowledge and belief, as follows:‡

Of small-pox.....cases; Of whooping-cough .....cases;
Of cholera.....cases; Of cerebro-spinal meningitis.....cases;
Of scarlet fever.....cases; Of diphtheria..... cases;
Of typhoid fever.....cases; Of .....cases;
Of measles.....cases;

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13. The date of the first case of each disease was as follows:

Of small-pox... .....18....; Of whooping-cough.. ....18....;
Of cholera..... ....18....; Of cerebro-spinal meningitis....18....;
Of scarlet fever.....18....; Of diphtheria..... .....18....;
Of typhoid fever.....18....; Of ....18....;
Of measles.....18....;

14. The date of the last case was as follows:

Of small-pox... ....18....; Of whooping-cough .....18....;
Of cholera.....18....; Of cerebro-spinal meningitis....18....;
Of scarlet fever.....18....; Of diphtheria.....18....;
Of typhoid fever.....18....; Of .....18....;
Of measles.....18....;

15. So far as known the sources from which the diseases were derived were as follows:

Of small-pox.....; Of cholera .....;
Of scarlet fever..... ....; Of typhoid fever.....;
Of measles..... .....; Of whooping-cough.....;
Of cerebro-spinal meningitis.....; Of diphtheria ....;
Of .....

16. I attribute the.....in this*.....during the year ending October 31, 1880, to the following causes or circumstances:.....

17. During the year ending October 31, 1880, the climatic conditions observed by me were as follows:.....

18. So far as I can ascertain.....fires have occurred in this.....during the year ending October 31, 1880, from causes as follows:.....and .....lives were lost.....persons injured in consequence thereof.

19. During the year ending October 31, 1880, I have attended.....meetings of this board of health, and the following measures were adopted in the interest of public health:..... ..

20. Cases of diseases dangerous to the public health† now prevail at time of completing this report, as follows:

Of small-pox.....cases; Of whooping-cough .....cases;
Of cholera.....cases; Of cerebro-spinal meningitis.....cases;
Of scarlet fever.....cases; Of diphtheria .....cases;
Of typhoid fever.....cases; Of .....cases;
Of measles .....cases;

21. In my opinion the *principal sources of danger* to life or health in this* ....at the present time are as follows:.....

My P. O. address is.....

I hereby certify that, to the best of my knowledge and belief, the statements in the foregoing report are correct.

Dated.....1880.

Signed.....

Health officer of the... ....of.....*

County of.....

---

*Insert the word "township," "city," or "town."

†This is the term employed in the law. It includes all communicable diseases, whether epidemic, infectious, or contagious.

‡In filling blanks followed by such words as "deaths," "cases," etc., numbers should be stated if possible, either in words or figures, and "0" should be written where that expresses the truth; for the reason that a *blank space indicates that the item has been overlooked*, and a dash should not be used in place of a cipher, because it is usually employed to indicate that a blank which should not be filled with a figure or letter has not been overlooked.

[a]If not sent, insert the syllable "out."

[b]If not sent, insert the word "not."

[c]Insert the word "greater," "less," or "the same," as the fact may be. If much greater or less, say so.

[d]Insert "increase" or "decrease," as the case may be.

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[e]Insert the number in figures.

[f]If there is absolutely no case to report, the blank form for cases need not be sent in as a part of your report. But it is important to fill all the blanks after names of diseases on this form, with ciphers if that expresses the truth to show that you have no case of each disease.

[g]After each disease insert the words "the disease was contracted in the city of ....," or "at the school in....," "in a room occupied by persons sick with the same disease.....(time) since," "by means of clothing worn by patient with same disease, etc., etc., as the facts may be. In the case of typhoid fever, if the privy was near the well, or within the dwelling, state the facts.

[h]Insert the words "excessive mortality," "excessive sickness," "general healthfulness;" or otherwise express the facts.

[i]Please state whether any lamp explosion has occurred, and especially mention any injuries to persons thereby.

In the foregoing report, PLEASE FILL ALL BLANKS IN SOME WAY, TO SHOW THAT NONE HAVE BEEN OVERLOOKED.

Please answer the questions as they are printed, and in the blank left for the purpose. DO NOT CHANGE OR MARK OUT ANY OF THE PRINTED MATTER.

BY-LAWS.

The following by-laws were reported by a special committee and adopted by the Board.

1. The annual meeting of this Board shall be in May of each year.

2. The President and Secretary shall be elected by ballot at the annual meeting, and shall hold their office for one year, unless sooner removed by a majority of the members present, for sufficient cause at any regular meeting, or at any meeting specially convened for that purpose.

In case of a vacancy occurring as above, it shall be competent for a majority of the members present to elect another President, or Secretary at such stated or regular meeting, to fill such vacancy until the next annual meeting.

3. The duties of the President shall be such as ordinarily pertain to the presiding officer of deliberative bodies, together with the duties as are prescribed by the act of the General Assembly creating this Board. He shall also supervise and indorse all circulars and forms used by the Board and its Secretary.

4. It shall be the duty of the Secretary to notify members of the time of holding all special and regular meetings of the Board; keep a correct record of all such meetings; supervise the preparation and issuing of all forms and circulars ordered; submit them to the President for his supervision and indorsement; and perform all other duties usually performed by such officer of State Boards of Health, or may be directed by vote of this Board.

5. The Secretary shall have his annual report ready for the inspec-

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tion of the Board at its November meeting each year; and shall have a complete draft of the biennial report, together with a copy of all circulars and forms issued, or used by himself or the Board, ready at the November meeting preceding the session of the General Assembly.

6. The Secretary shall receive a salary at the rate of one thousand dollars per annum, payable as specified in chapter 151, laws of the Eighteenth General Assembly.

7. The President shall call a special meeting of the Board on the application of three members of the Board, at such time and place as may be specified.

STANDING COMMITTEES.

For the inauguration of a system whereby the work of the Board might be facilitated, standing committees were appointed, to whom were referred some of the most important sanitary and hygenic subjects. The subjects and name of the chairman of such committees are as follows:

Food, Drinks, and Water Supply—W. H. Dickinson, M. D.

Rest--Ephraim M. Reynolds, M. D.

Ventilation—Justin M. Hull, M. D.

Education—Relation of Schools to Health—Kind and Methods of Instruction in use, and Methods to be Proposed—Geo. F. Roberts, M. D.

Sewerage, Drainage, and Disposal of Excreta.—James L. Loring, civil engineer.

Influence of Slaughter-houses, Rendering-houses, etc., on Public Health.—Philip W. Lewellen, M. D.

Endemics, Epidemics, and Contagious Diseases.—Henry H. Clark, M. D.

Legislation Relating to the State Board of Health.—William S. Robertson.

CIRCULARS.

The following circular, directed to the health physician of local boards, was sent to each township and city clerk in the State, together with blank form 1C.

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TO HEALTH PHYSICIANS.

FORM 8B.]

OFFICE OF THE SECRETARY
OF THE STATE BOARD OF HEALTH,
DES MOINES IOWA, October 1, 1880.

TO THE HEALTH OFFICER:

SIR—I herewith send you a blank form (1C) for your use in making your annual report to this Board, required by law,* *for the year ending October 31.*

PLEASE FILL OUT AND RETURN THIS REPORT AS SOON AS POSSIBLE.

The blank form is somewhat similar to one which we sent to the clerk of your board, but your report should be made according to your best knowledge, leaving his report to be made by him according to his best knowedge. If each of you will report the cases reported to himself we will then know the total number of cases reported, and to which class of officers the greatest number of reports are made; and if we have estimates of the probable number of cases not reported, made by two different persons in each locality, we may gain a good idea of the actual condition of the public health and of the public-health service in the different parts of the State. As soon as sufficiently accurate and complete reports are received from such a proportion of the localities as will be fairly representative, it is designed that they shall be compiled and published. General truths concerning the entire State cannot well be reached by compilation of reports when only the best, or poorest townships of many counties are represented; it is, therefore, important that every health officer shall make a report. For a similar reason, *every blank should be filled.* If no sickness has occurred within your jurisdiction, or if there has been *no case* of any disease concerning which a report is asked, it is important to state that fact, and the reason, if known, for such healthfulness, and also the population, etc., in the blank spaces provided for those statements in the report. *It is also important to fill the blanks for the probable number of cases of diseases not reported to you.* It is necessary to have uniform blank forms, because it is impossible to compile from letters and postal-cards, on account of the time required to search through them; and for this reason every fact to which this report relates should be entered in its proper place in the report.

Your report should be made out *for the exact territory over which your board has jurisdiction,* and for which you are the health officer, and it *should not include* anything outside of such jurisdiction. A township board of health *does not have jurisdiction in an incorporated town or city,* even though such city or town be situated within the limits of the township. If you have been appointed health officer for a township and an incorporated city or town, it is necessary that you make separate reports for each, just as separate as if they were made by different persons.

* Chapter 151, laws of 1880, section 15. It shall be the duty of the health physician and also the clerk of the local board of health of every incorporated town, and also the clerk of the local board of health of each incorporated town or village, township, city, and village in the State, at least once a year, to report to the State Board of Health their proceedings, and such such other facts required, on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health.

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Please ascertain and report, as completely as possible, the causes of all fires within your jurisdiction during the year, also the number of lives lost, and of persons injured in consequence thereof.

I send you a blank sheet for your report of cases of diseases dangerous to the public health, that you may have a knowledge of the report required. If you have more cases to report than can be reported upon one side of a sheet, please write to this office for blanks, stating the additional number of sheets you need. You will find blank spaces for this near the middle of the first page of the blank form 1C.

The blank which I send for your report of cases of diseases is recommended by this Board as a proper form for a record of such cases; to be retained in your office. Your attention is respectfully asked to chapter No. 151, laws of 1880, relative to duties of health officers of cities and towns. It is recommended that your board of health have copies of the law thoroughly distributed within your jurisdiction, in order to call attention to the law, and secure material for a complete record in your office, relating to diseases which endanger the public health.

It is not expected that it will always be possible to fill every column of your record; but so much as it is possible to learn concerning each case should be recorded and reported, because the single fact of the number of cases of sickness from each such disease will be of value in connection with the records of deaths and other knowledge collected at this office. It is hoped that you will not fail to record all cases of such diseases under your care.

In case any disease should appear in your locality as an epidemic, please make a special report of the fact to this office as soon as possible. It is also expected that you will study and record the conditions coincident with the rise, progress, and decline of any such epidemic, and in due time report the same to this Board. Concerning every such occurrence you should be able to report some facts which will be of use in advancing the cause of public health.

By direction of the State Board of Health.

Very respectfully,

L. F. ANDREWS, *Secretary.*

Please preserve and file the circulars which you receive from this office.

SLAUGHTER-HOUSES.

[FORM 6B.]

TO THE HEALTH OFFICERS OF.....

Will you please send, as soon as possible, in the enclosed directed and stamped envelope, answers to the following questions:

1. Please state the name of your city.
2. How many inhabitants in your city?
3. How many butchers or meat-market men are there?
4. How many places for slaughtering animals.
5. How many animals are annually slaughtered, specifying the number of
   - *a.* Beeves—
   - *b.* Sheep—
   - *c.* Calves—
   - *d.* Hogs—
   - *e.* Other animals—

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6. How many butchers do their slaughtering in one place?

7. How are the slaughter-houses situated in reference to the city limits?

8. How are they situated in reference to the thickly settled portion of the city?

9. Are any of the slaughter-houses now offensive to people living near them, or passing them?

10. Have any cases of sickness occurred fairly attributable to such causes? If so, state full particulars.

11. How are the slaughter-houses floored?

12. How are the blood, offal, and bones disposed of?

13. What is the drainage of the slaughter-houses?

14. Does the drainage from any of them go into a sewer?

15. How are they supplied with water?

16. What are the opinions of the men engaged in the slaughtering business as to the comparative economy and convenience of private separate slaughter-houses, and *one* place in which all slaughtering should be done?

FAT-RENDERING AND BONE-BOILING.

17. How many fat-rendering and bone-boiling establishments are there in your city?

18. Are any of them as now carried on offensive to the people?

19. Do they cause sickness?

20. Have any complaints been made in your city as to unwholesome meats being offered for sale?

21. Are the meats now sold in your city properly inspected before being offered for sale?

22. With respect to fat-rendering, bone-boiling, etc., what are the opinions of the men engaged in the business as to the economy and convenience of private separate places, compared with one place in which to do all such work?

A prompt reply is respectfully requested by

P. W. LEWELLEN,
Member of State Board of Health.

CLARINDA, May 20, 1880.

This circular was distributed by Dr. Lewellen as chairman of the Committee on Slaughter-houses, and his report will be found in another place.

Dr. Robertson, of the Committee on Instructions to, and Rules and Regulations for Local Boards of Health presented their report, which after general discussion was adopted. This report is embodied in the following circular:

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[FORM 13B.]

RULES AND REGULATIONS FOR LOCAL BOARD OF HEALTH.

The Rules and Regulations recommended by the State Board for adoption by local boards, are as follows, to-wit:*

Rules and Regulations adopted and published by the Board of Health of..... and which will be strictly enforced by this Board (1) for prevention of disease.

RULE 1.—No privy vault, cess-pool, reservoir into which a privy, water-closet, stable or sink is drained, except it be water tight, shall be established or permitted within fifty feet of any well, spring, or other source of water used for drinking or culinary purposes.

Reason.—Soil, especially if it be sandy loam or gravel, or clay with inclined strata or layers, is often an unsuspected conductor of the liquid contents of such receptacles to wells or springs of water. Many well authenticated cases of typhoid fever and other dangerous and often fatal diseases, have been traced to water so contaminated.

RULE 2.—Earth privies, or earth closets, with no vault below the surface of the ground, shall be excepted in Rule 1, but sufficient dry earth or coal ashes must be used daily to absorb all the fluid part of the deposit, and the entire contents must be removed monthly.

Reason.—Dry earth or coal ashes, are nearly complete disinfectants if used in sufficient quantities to absorb all the fluids.

RULE 3.—All privy vaults, cess-pools or reservoirs named in Rule 1, should be cleaned out at least once a year; and from the first of May to the first of November of each year, shall be thoroughly disinfected by adding to the contents of the vault, once every month, one or two pounds of copperas dissolved in a pailful of water.

Reason.—During the hot season prutrescent gases are given off from the decomposing excreta in such vaults. These gases are not only very offensive, but are frequently the cause of dangerous diseases. They contain compounds of ammonia, which are decomposed by solution of copperas, and the foul odor destroyed. In a family vault two pounds of copperas a month is usually sufficient. In vaults used by large number of persons, five or more pounds of copperas should be used monthly.

RULE 4.—No privy vault or cess-pool shall open into any stream or ditch, or drain, except common sewers.

Reason.—Same as for Rule 1.

RULE 5.—Within the limits thus bounded; to-wit, ... which area shall constitute the health limits of this... .....no night soil or contents of cess-pool shall be removed unless previously deodorized by mixing with a solution of copperas; and during removal the material shall be covered with a layer of fresh earth, except the removal be by the "odorless excavating process."

Reason.—Same as for Rule 3.

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*Sec. 2, Chap. 151, Laws 1880.

(1) See Chap. 151, Laws 1880, Sec. 16.

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RULE 6.—All sewer drains that pass within fifty feet of any source of water used for drinking or culinary purposes, shall be water tight, and in sandy subsoil the limit shall be eighty feet.

Reason.—The danger of contaminating the water.

RULE 7.—No sewer drain shall empty into any lake, pond or other source of water, used for culinary purposes, nor into any standing water, within the jurisdiction of this board.*

Reason.—Same as for Rule 1.

RULE 8.—No garbage, materials manufactured in whole or in part of wool, silk, leather, India rubber, etc., or other materials which evolve offensive gases during combustion, shall be burned within the health limits of this corporation [or township].

RULE 9.—No house offal, or dead animals of any kind, shall be thown upon the streets, or left exposed by any person, and no butcher, fishmonger or vender of merchandise of any kind, shall leave any refuse upon the streets, or uncovered by earth upon any of the lots of this city [town or township]; and all putrid and decaying animal matter must be removed from all cellars and out-buildings on or before May first in each year.(2)

RULE 10.—All keepers of hotels, restaurants, and others, accumulating garbage, are required to have a proper covered receptacle for swill and house offal, and to cause the contents to be regularly removed as often as twice each week between the first day of May and the first day of November, and once each week at all other seasons.

Reasons same as for Rules 9 and 10.—Decomposing animal and vegetable matter are the sources of poisonous gases dangerous to public health.

RULE 11.—Between the first day of May and the first day of November no hogs shall be kept within the limits named in Rule 5, except in pens with floors, the pens to be kept entirely free from standing water, and regularly and freely disinfected; and during the months named no hogs shall be kept elsewhere within the jurisdiction of this board, within twenty-five rods of any dwelling, except in pens with dry floors, or kept free from standing water.

This board will order the removal of such animals at any time, when they appear to be prejudicial to the public health, safety or comfort.

Reason.—Same as for Rule 9 and 10.

DISEASED ANIMALS.

RULE 12.—No animal affected with an infectious or contagious disease shall be bought, sold or kept within the jurisdiction of this board. And any animal affected with glanders shall, after notice from this board, be immediately killed, and buried deep, without removing the hide from the carcass.(3)

The owner or any person having the care of any animal within the limits of this [city, town or township] knowing or having reason to believe said animal to have the disease called glanders, or farcy, shall not lead, drive, or permit such animal to

*Code, Sec. 4089.

(2) Section 4089, Code of 1873.

(3) See Code of 1873, Secs. 4054-5-6-7-8.

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go in or over any public grounds, uninclosed lands, street, road, public highway, lane or alley in this [city, town or township] or water such animal, or permit it to drink at any public water trough, pail or spring; or suffer such diseased animal to be kept in any enclosure in or from which it may come in contact with or close proximity to any other animal not affected with such disease; and such persons aforesaid, shall within twenty-four hours give notice to the health officer or the board of health of this [city, town or township] of the location of the diseased animal. And any veterinary surgeon, or any person who acts as such, who shall have knowledge of any animal diseased with glanders or farcy within the jurisdiction of this board shall, within twenty-four hours, give notice of the same to the health officer or board of health of this [city, town or township].

Everything about the stable, combs and brushes or any post or fence where he has stood, and every part of harness or wagon used upon or about a glandered animal, and the stable where kept should be destroyed and burned. And all persons should use the greatest precaution against exposure from such sources.

RULE 13.—No diseased animal, or its flesh, and no decayed, diseased or unfit meat, fish, vegetables or fruit; nor diseased, impure or adulterated milk, nor other impure, diseased or adulterated article used for food, shall be sold nor offered for sale as food.(1)

RULE 14.—No dead animal shall, within the jurisdiction of this board, be put in any river, well, spring, cistern, reservoir, stream or pond.(2)

SLAUGHTER-HOUSES.

Rules and regulations for the conduct of slaughter-houses, and for rendering or bone-boiling establishments.

1. It is desirable, when practicable, and it is believed to be subservient not only to the convenience, but also to the pecuniary advantage of those engaged in the business, that all the slaughtering, as well as all the rendering, etc., should be done at one place.

2. Location of slaughter-houses, etc.:—

a. An abattoir, if thoroughly drained into a properly constructed sewer, and if no blood or offal are fed to swine on the premises, and which shall be conducted strictly according to the rules below, *may* be allowed within the limits of a town.

b. Small, separate, or private slaughter-houses should, as a rule, be outside the town or city limits, or at least in the very thinly populated portions, and not within twenty rods of any public highway.

c. They should be located on dry, hard land that can be well drained.

d. They should be amply supplied with clean, wholesome water, from springs, wells, or unpolluted streams.

e. They should be floored with a tight, solid floor of hard wood, or of cement or well-joined stone.

f. The yards, sheds, and close pens should be dry, and free from mud and filth, and their sides or walls should be thoroughly whitewashed at least twice a year.

(1) See Code of 1873, Secs. 4035-36, 4042, 4055, 4056, 4057, 4058, and Chap. 137, laws 1880.
(2) See Code of 1878, Sec. 4041.

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3. The slaughter-house and all its apparatus should be kept in a neat and orderly manner, free from all offensive smells.

a. When the slaughtering for the day is completed the sides and the floor of the slaughter-room should be thoroughly washed with an abundance of clean water. No other disinfectant will be required.

b. No animal matter of any kind should be permitted to remain in, under, or near the slaughter-house to decompose or purify.

4. When blood and offal or immature animals are fed to swine on the premises, such arrangements shall be made that such material shall be speedily consumed, and that the unconsumed portions shall be prevented from given off offensive smells, as follows:

a. The blood of all slaughtered animals should be conducted by a water-tight gutter to a water-tight trough in the hog-yard.

b. The offal and bodies of immature animals should be thrown into a pen with a tight, dry floor, to be consumed at once by the swine; and all portions not consumed within twenty-four hours should be removed from the pen, and should be burned, buried, or composted with fresh earth.

5. When the blood or offal are not fed to swine on the premises, they should every day be carted off in close tanks, and in other places treated as described in Rule 4, or should be converted into fertilizers, or otherwise utilized by an apparatus, the gases arising from which should be carried under the furnaces and be consumed.

6. The fat, and all materials from which fat or oil is to be extracted, should be rendered within such time after the slaughtering of the animals that no offensive odors shall arise from them, or from the process of rendering.

It is believed that slaughter-houses of every capacity, carried on in accordance with the foregoing rules and regulations, will be so free from offensive smells as not to be injurious to the health of any one, and justly obnoxious to the complaints of no one.

NUISANCES.

The statute, chapter 151, sections 16, 17, 18, 19, 20, laws of 1880, provides that boards of health shall make such regulations respecting nuisances, sources of filth, and causes of sickness, as they shall judge necessary for the public health and safety. If any nuisance, source of filth, or cause of sickness found on private property be not removed within twenty-four hours after notice given by the board, the board may then order the same removed.(1)

(1) SEC. 16. Local boards of health shall make such regulations respecting nuisances, sources of filth, and causes of sickness within their jurisdiction, and on board any boats in their ports or harbors as they shall judge necessary for the public health and safety; and if any person shall violate any such regulations, he shall forfeit a sum of not less than twenty-five [dollars] ($25) for every day during which he knowingly violates or disregards said rules and regulations, to be recovered before any justice of the peace or other court of competent jurisdiction.

SEC. 17. The board of health of any city or incorporated town or village shall order the owner of any property, place or building (at his own expense) to remove any nuisance, source of filth or cause of sickness found on private property, within twenty-four (24) hours, or such other time as is deemed reasonable, after notice served as hereinafter provided; and if the owner or occupant neg-

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In order that boards of health may act understandingly in the removal of nuisances which are injurious to the public health, it is essential that they should have a clearly defined idea of what nuisances are, which they may remove or cause to be removed. An actionable nuisance is said to be anything wrongfully done, or permitted, which injures or annoys another in the enjoyment of his legal rights. (2) Every person has the legal right to the fullest enjoyment of his life and health. Anything, then, which injuries or annoys the public in the enjoyment of life or health is a nuisance, which it is the duty of boards of health, as the guardians of the public health, to abate.(3)

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lects to do so, he shall forfeit a sum not exceeding twenty dollars ($20) for every day during which he knowingly and willfully permits such nuisance or cause of sickness to remain after the time prescribed for the removal thereof.

SEC. 18. If the owner or occupant fails to comply with such order the Board may cause the nuisance, source of filth or cause of sickness to be removed, and all expenses incurred thereby shall be paid by the owner, occupant or other person who caused or permitted the same, if he has had actual notice from the board of health of the existence thereof, to be recovered by civil action in the name of the State before any court having jurisdiction.

SEC. 19. The board, when satisfied upon due examination, that any cellar, room, tenement, or building in its own town, occupied as a dwelling-place, has become, by reason of the number of occupants, or want of cleanliness, or other cause, unfit for such purpose, and a cause of nuisance or sickness to the occupants or the public may issue a notice in writing to such occupants, or any of them, requiring the premises to be put in a proper condition as to cleanliness, or, if they see fit, requiring the occupants to remove or quit the premises within such time as the board may deem reasonable. If the persons so notified, or any of them, neglect or refuse to comply with the terms of the notice, the board may cause the premises to be properly cleaned at the expense of the owners, or may remove the occupants forcibly and close up the premises, and the same shall not again be occupied as a dwelling-place without permission in writing of the board.

SEC. 20. Whenever the board of health shall think it necessary for the preservation of the lives or health of the inhabitants to enter a place, building or vessels in their township, for the purpose of examining into and destroying, removing or preventing any nuisance, source of filth or cause of sickness, and shall be refused such entry, any member of the board may make complaint, under oath, to any justice of the peace of his county, whether such justice be a member of the board or not, stating the facts of the case, so far as he has knowledge thereof. Such justice shall, thereupon, issue a warrant, directed to the sheriff or any constable of the county, commanding him to take sufficient aid, and, being accompanied by two or more members of said board of health, between the hours of sunrise and sunset, repair to the place where such nuisance, source of filth, or cause of sickness complained of may be, and the same destroy, remove, or prevent, under the direction of such members of the board of health.'

(2) Cooley on Torts, page 565; *Rex v. Watts*, 2 C. & P., 486, slaughter-house; *Ranketl's Case*, 2 Rolle's Abr., 140, 141. melting stinking tallow; *Catlin v. Valentine*, 9 Paige's Ch. (N. Y.), 576, slaughter-house; *Pick rd v. Collins*, 23 Barb. (N. Y. S. C.), 444, barn; Wood on Nuisances, Sec. 494.

(3) Code of 1873, Sec. 4098. "The erecting, continuing, or using any building, or other place, for the exercise of any trade, employment or manufacture, which by occasioning noxious exhalations, offensive smells, or other annoyances, becomes injurious to the public health, comfort or property of individuals, or the public, *the causing or suffering any offal, filth or noisome substance to be collected or to remain in any place, to the prejudice of others*, the obstructing or impeding without legal authority, in the passage of any navigable river, harbor or collection of water; or the corrupting or rendering unwholesome or impure the water of any river, stream or pond; * * * * are nuisances."

Where an indictment charged that the defendant "unlawfully and injuriously did erect, continue and use a certain enclosure or pen, in which cattle and hogs were confined, fed and watered, and the

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Any classification of nuisances will be necessarily imperfect; yet for the purposes of this subject, it may be said that public health nuisances are of two kinds:

1. Those which are such from their very nature, and which cannot exist in the vicinity of habitations without causing offense to the senses, and injury to the health; such, for instance, as the exposed and decaying carcasses of dead animals, or accumulations of offal or fœcal matter in exposed places.

2. Those which become nuisances by reason of the misuse or negligent care exercised of an otherwise harmless and perfectly lawful object, business, or occupation; as, for instance, slaughter-houses, rendering-establishments, mill-ponds, or burying-grounds.

The methods of procedure to be adopted for the removal of any unhealthy nuisance will vary according as the nuisance to be abated comes within one or the other of these classifications.

If a board of health find any decomposing or offensive matter upon private property, which, in their opinion, is injurious to health, they must first order the owner or occupant to remove it within twenty-four hours. If he neglects to do so they may proceed summarily to cause such nuisance to be removed. If the danger to the public health is imminent, and safety requires immediate suppression or abatement of the nuisance, the board of health, or any individual affected thereby would be protected if they proceeded at once to suppress it, for the safety of the people is the highest law. (1) But that which is exclusively a common or public nuisance cannot lawfully be abated by the private acts of an individual.(2) If any unhealthy nuisance is found in a public place, it would be the duty of the board of health to cause its immediate removal.

If a pond, a slaughter-house, or a burial-ground, or anything of a kindred nature becomes offensive and unhealthy to the community, it is the duty of the board of health to proceed at once to ask the aid of the courts to enjoin the further continuance of the nuisance and secure its abatement. Whether a business or a thing, not in itself a nuisance, is so managed or suffered to exist, as to be a nuisance, is a fact which must be determined by the courts, upon evidence. A board of health cannot decide that to be a nuisance which is not so in and of itself. Although slaughter-houses are regarded by the courts as *prima facie* nuisances, a person engaged in carrying on the business of slaughtering animals cannot be compelled to discontinue that business upon the judgment of any person, or tribunal, except that of a court of competent jurisdiction. In this way alone can a board of health

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excrement, decayed food, slops, and other filth were retained," whereby were occasioned "noxious exhalations and offensive smells, greatly corrupting and infesting the air; and other annoyances dangerous to the public health, comfort and property of the good people residing in that immediate neighborhood," it was *held*, that "the acts charged constituted a public indictable nuisance, both under this section (4089) of the statute, and at the common law." The *State v. Kaster*, 35 Iowa Supreme Court Reports, 221.

Any use of property, or any trade, that corrupts the atmosphere with smoke, noxious vapors, noisome smells, dust or other substances or gases producing injury to property, or to health, or impairing the comfortable enjoyment of property, is a nuisance. Wood on Nuisances, page 574, section 531.

(1) *Meeker v. Rensselaer*, 14 Wend., 397.

(2) *Harrower v. Ritson*, 36 Barb. (N. Y. S. C.), 201: Wood on Nuisances, Secs. 744, 515.

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legally determine whether such a business is a nuisance so as to authorize them to abate it. Of course any collection of offal or filth in or about the slaughter-house may be removed by the board of health and the place may be required to be kept clean under the authority conferred by sections 17 and 18, chapter 151, laws of 1880, but the suppression of the business itself can only follow a judicial determination that it is so conducted as to be injurious to the public health.(3)

As to whether or not animals affected with a contagious disease, may be summarily destroyed, the general rule seems to be that so long as the owner restrains the animal upon his own premises, no person has the right to kill them; but if they are suffered to go at large, or if they escape from the owner's custody, the owner of the premises upon which they escape, may kill them if necessary for the protection of his own animals. (4) In the case of a horse or other animal affected with glanders, which is recognized by the courts as an incurable disease, (5) and one which may communicate all its loathsomeness and fatality to human beings, there is no question but what a board of health would be protected in destroying them wherever found, after due notice given to the owner, if in their opinion it was necessary for the public health. This protection, to the individual and to the board, would however, only be afforded in case the disease was actually the glanders, and comes under the extraordinary powers granted to the State Board, in section 2, chapter 151.

From the foregoing it will be seen boards of health are armed with power to suppress unhealthy nuisances, which they should be prompt to exercise in all cases where the public health is or will be jeopardized. While it is true an individual injured by a nuisance may, in his own behalf, institute proceedings to abate it, yet it is eminently more fitting, and it is clearly the duty of the board of health, in behalf of the community, whose guardians they are, to institute such proceedings and secure the abatement of the nuisance.

Boards of health should acquaint themselves with all the facts relating to a nuisance, carefully apply the facts to the law, that they may know how to move successfully to prevent or remove the same. In cases of doubt, legal counsel should be sought before proceeding.

The success of boards of health depends very much upon the firmness with which they enforce needful sanitary regulations, as well as the caution manifested in avoiding unnecessary exactions and investigations.

L. F. ANDREWS, *Secretary.*

For the purpose of securing uniformity of action throughout the State the foregoing rules and regulations were ordered published and distributed to all local boards of health. Copies have also been sent to the press, thus securing an extensive circulation.

Immediately after the publication of the foregoing regulations, fre-

(3) *Schuster v. Met. Board of Health*, 49 Barb. (N. Y. S. C.), 450: Wood on Nuisances, Secs 494, 504, 525.

(4) Wood on Nuisances, Sec. 837.

(5) Hanover's Law of Horses, p. 76.

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quent inquiry was made by local boards whether or not rules and regulations made by the State Board of Health were in force and effect upon local boards. The matter was referred to the Attorney-general who decided that "Rules and regulations made by the State Board of Health and directed to local boards of cities, towns, etc., are of full force and effect upon the people without subsequent indorsement or action of such local boards."

This decision seems to be in harmony with the intent and object of the law. Local boards exist by statute without action of the persons comprising such boards, and under this decision communities are given the means of protection from contagious disease, and sources of sickness when their local boards neglect or refuse to provide the same.

The prevalence of glanders among horses in various sections of the State, and the want of statutory provisions, to protect the people from infection necessitated some action by the State Board of Health. The foregoing rules and accompanying notes were prepared, to that end, and to inform the people more fully as to the nature of the disease, and their rights for protection under the common law. This disease is more fully set forth in a special paper in another part of this report.

At the meeting of the Board in November, the subject of contagious or infectious diseases was fully discussed, and circulars, setting forth rules for their prevention and restriction, were prepared. They have been distributed to all clerks of townships, towns and cities in the State, and extensively published by the press.

[Form 17B.]

RESTRICTION AND PREVENTION OF SCARLET FEVER.

Scarlet fever is now believed to be one of the most contagious diseases.* One attack usually prevents subsequent attacks. The greatest number of deaths from this disease are of children under ten years of age. Adult persons do sometimes have the disease. Scarlet fever is believed to arise from a special contagium or poison which may be conveyed, to persons previously unaffected, by personal contact, by infected clothing or paper rags, or by any of the discharges from the body of a person affected with the disease.

The discharges from the throat, nose and mouth are considered extremely dangerous, and those from the skin, eyes, ears, kidneys and bowels are also dangerous, and remain so for a considerable time.

*This disease is sometimes called "scarlatina," "scarlet rash," canker rash, etc.

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Filth, all forms of uncleanliness, and neglect of ventilation increase the danger of spreading the disease.

Communication. It is believed that the disease may be communicated by a person recovering therefrom so long as the usual subsequent scaling or peeling of the skin continues.

The interval of time which may elapse after exposure to the contagium of scarlet fever, and during which a susceptible person so exposed may expect to be taken sick with the disease, varies from one to fourteen days.

Separation of the sick from the well. Whenever a child has sore throat and fever, and especially when this is accompanied by a rash on the body, the child should be immediately isolated as completely as possible from other members of the household, and from other persons, until a physician has seen it and determined whether it has scarlet fever. **All persons known to be sick with this disease should be promptly and thoroughly isolated from the public.***

The room into which one sick with this disease is placed should previously be cleared of all needless clothing, carpets, drapery, and other materials likely to harbor the poison of the disease, except such articles as are essential to the well-being of the patient. The sick room should have no carpet, or only pieces which can afterward be destroyed. Provision should be made for the introduction of a liberal supply of fresh air and the continual change of the air of the room without sensible currents or drafts.

Pocket-handkerchiefs, that need to be saved, should not be used by the patient; small pieces of rag should be substituted therefor, and after being once used should be immediately burned.

Soiled bed and body linen should be placed in vessels of water containing chlorinated soda, chlorinated lime or other disinfectant before removal from the sick room.

For this purpose chlorinated soda is the neatest and most convenient because it can be used with soap, but it is apt to lose its disinfecting properties by age. Chlorinated lime, if used too freely, may destroy articles of clothing with which it comes in contact, but if properly used it is the safest as a disinfectant.

The discharges from the patient should all be received into vessels containing "chloride of lime," copperas, or some other known disinfectant,† and the same buried at once, and not by any means be thrown into a running stream, nor into a cess-pool or a water-closet, except after having been thoroughly disinfected. All vessels should be kept scrupulously clean and disinfected.

Perfect cleanliness of nurses and attendants should be enjoined and secured. As the hands of nurses of necessity become frequently contaminated by the poison of the disease, a good supply of towels and two basins—one containing solution of chlorinated soda (Labaracque's solution), chloride of lime or other dis-

*That this is of more importance than in the case of small-pox is indicated by the fact of the much greater number of cases of sickness and of deaths from scarlet fever—a disease in which there is no such preventive known as vaccination.

†Carbolic acid in dilute form, as generally used, is not believed to be a disinfectant.

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infecting solution, and another for plain soap and water, should always be at hand and freely used.

Persons who are attending upon children or other persons suffering from scarlet fever, and also the members of the patient's family, should not mingle with other people nor permit the entrance of children into their house.

Funerals of those dying from scarlet fever should be strictly private and the corpse not exposed to view. To avoid mistakes *notices* of such deaths in the papers *should state* that the deceased died of scarlet fever, that there may be a full comprehension of the character of the disease. No form of scarlet fever is devoid of danger however simple the early symptoms, or trifling the course of the disease, for most serious results have followed the most simple cases.

All persons recovering from scarlet fever should be considered dangerous, and therefore **should not attend school, church, or any public assembly, or use any public conveyance,** so long as any scaling or peeling of the skin, soreness of the eyes or air-passages, or symptoms of dropsy remain. No person recovering from scarlet fever should thus endanger the public health nor appear in public until after having taken four times, at intervals of two days, a thorough bath. This *cleansing*, however, *should be deferred* until the *physician in charge considers it prudent.* After recovery from scarlet fever, no person should appear in public wearing the same clothing worn while sick with, or recovering from, this disease.

Gaseous disinfection, or fumigation, can only be completely and entirely effectual in the absence of living persons, as fumes strong enough for the purpose are destructive of human life. This need not deter from doing as much as possible, without injury to sick persons, for the purification of the air of rooms occupied by them—a liberal supply of pure air should be secured; but after the sick have recovered, the room, furniture, and other contents not to be destroyed, should be thoroughly exposed for several hours to strong fumes of chlorine gas, or to fumigation by burning sulphur; or the paper on the walls, if any, removed and burnt, the furniture scrubbed or polished, and the room thoroughly scrubbed and whitewashed.

When a room and contents are to be disinfected, all articles therein should be spread out so as to expose the greatest amount of surface to the action of the disinfectant, *and all openings to the room should be closed.*

To generate chlorine, take peroxide of manganese (to be obtained at any drug store), place in an earthen dish and add one pound of hydrochloric acid (sometimes called muriatic acid) to each four ounces of the peroxide of manganese. Care should be taken not to inhale the gas. After being certain that continuous evolution of chlorine has been secured, leave the room and close the door of exit.

The bleaching properties of chlorine may destroy the color of colored goods exposed to it, but as a disinfectant, it is one of the best.

To generate sulphurous acid gas, put live coals on top of ashes in a metallic pan, and place on the coals sulphur in powder or fragments. Of the two, sulphurous acid gas is equally efficient, and avoids the risk of bleaching colored cloths.

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A convenient way is to place the coals and sulphur on a heated stove plate or cover turned bottom upward in a pan half filled with ashes. To disinfect 100 cubic feet of air requires the thorough combustion of about one and one-half ounces of sulphur.

Rooms should be kept closed and subjected to the action of the disinfecting gas for six or eight hours, and afterward thoroughly aired by opening doors and windows.

Heat as a disinfectant.—It is believed that heat sufficient to be disinfectant for this disease may be secured without destroying ordinary articles of clothing, say at 240° to 250° F.

Whenever a case of this disease occurs in a locality, prompt and vigorous action should be taken for the restriction of the disease, by early isolation of those sick with the disease, and by the destruction or disinfection of all articles likely to be infected.

Plain and distinct notices should be placed upon the premises or house in which there is a person sick with scarlet fever, and **no child that has not had the disease should be allowed to enter,** or to associate with persons who do enter such house or room.

Householders, physicians, and boards of health, have duties to the public, and in order that the guardians of the public health may have early warning, it is important that every case of scarlet fever be promptly reported to the local board of health.

"Whenever any *householder* shall know that any person within his family is taken sick with the small-pox, scarlet fever, diptheria, *or any other disease dangerous to the public health*, he shall immediately *give notice thereof to the board of health*, or to the *health officer* of the township [city or town] in which he resides; and if he shall refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars.(1)"

"Whenever any *physician* shall know that any person whom he is called to visit is infected with the small-pox, scarlet fever, diptheria, *or any other disease dangerous to the public health*, such physician shall immediately *give notice* thereof to the board of health or health officer of the township [city or town] in which such diseased person may be; and every physician who shall refuse or neglect to give such notice, shall forfeit for each offense, a sum not less than fifty nor more than one hundred dollars."*

When the small-pox, *or any other disease dangerous to the public health* is found to exist in any township [city or town] *the Board of Health should use all possible care to prevent the spreading of the infection*, and to *give public notice of infected places*, by such means as in their judgment shall be most effectual for the common safety.

Local boards of health should also make such regulations as they may deem necessary for the public health and safety respecting any *articles which are capable of containing or conveying any infection or contagion, or of creating any sickness*, or when such articles shall be brought into or conveyed from their township, or into or from any vessel; and if any person shall violate any such regulation he should forfeit a sum not less than twenty dollars.

The general laws of this State provide that the mayor and aldermen of cities and the trustees of townships "shall have and exercise all the powers, and perform all the duties, of a board of health as provided in chapter 151, laws of 1880."

The local board of health and the physicians in charge of cases of this dis-

*Local boards should adopt these regulations and give public notice thereof. The board, or any member thereof, may prosecute violations as provided in chapter 151, laws of 1880, Sec. 23.

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ease should co-operate for its restriction. The local board of health should particularly guard against its spread where no intelligent physician is employed.

All clothing, carpets, curtains, furniture and other substances that are to be destroyed should be dealt with in a way to avoid conveying the poison to any person in the process; they should not be simply thrown away, or into some stream or body of water; and if burned should be completely burned and not simply heated or dealt with in a way to diffuse the poison of the disease.

All such infected substances which are not destroyed should be thoroughly boiled, subjected to a dry heat of 250° F. in a closed room or disinfecting oven, or be thoroughly exposed to fumes of chlorine or of burning sulphur. *Books and furs* that have been handled by those convalescing from this disease *are particularly liable to convey the poison* to children who have never had the disease. Great care should be used to thoroughly disinfect any such articles that are not destroyed; and caution should be exercised before allowing children who have not had scarlet fever to handle any such articles that have been used by persons liable to communicate the disease. The Massachusetts State Board of Health state that prolonged boiling of clothing and bedding thoroughly disinfects them.

Fresh air. Although not so active for the destruction of the contagium as is chlorine or sulphurous acid gas, pure air, in liberal amount, is a very useful and important agent for the dilution and destruction of the poison of the disease; it should be employed freely; but with this as with other procedures for the safety of the unaffected, great care should be taken not to increase the danger to those already sick from any cause, who are usually endangered by exposure to drafts of cold air, and this is especially true of persons convalescing from scarlet fever.

[FORM 18 B.]

RESTRICTION AND PREVENTION OF DIPHTHERIA.

Because diphtheria has been and may be expected again to be widely prevalent, and is a formidable and fatal disease, and because it is believed to be a disease very largely preventable, the State Board of Health desires to disseminate as widely as possible among the people of this State the knowledge of certain facts and principles which seem to be well established as to the nature and causes of the disease, and the rational means for its restriction and prevention.

Nature of the disease.—Diphtheria is, primarily or secondarily, a constitutional, or blood-poisoning disease. It attacks persons of all classes and ages, but most frequently children under sixteen years of age.

In ordinary cases the poisonous principle of diphtheria probably enters the blood by way of the mouth and the air-passages.

The period of incubation of diphtheria, or the time from a person's exposure to the disease with his coming down with it, varies somewhat—being usually from a few hours to seven or eight days; in some cases, it is twelve or fourteen days.

Its most frequent local manifestations are in the mouth, throat, and air-passages. When in the mouth or upper part of the throat only, the disease is, as a rule, less dangerous and fatal, but none the less contagious, than when in the air-passages, below the fauces.

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The specific contagium developed by the disease itself, and by which it spreads, is diffused by the exhalation (breath, perspiration, etc.) of the patient, through the air immediately surrounding him, as well as by clothing or other solid substances that have been brought into contact with the products of the disease.

As a rule, the virulence or malignancy of the contagium is in direct proportion to the severity of the case from which it emanates, though malignant cases may result from exposure to a mild case.

The more this contagium is allowed to accumulate in the room where the patient lies, the more powerful does it become.

Restriction of Diphtheria—**Diphtheria is a contagious disease** and hence the strict observance of the following precautions is of very great importance.

1. Every person known to be sick with this disease should be promptly and effectually isolated from the public—one or two persons only should take entire charge of the patient, and they should be restricted in their intercourse with other persons.

2. The room in which one sick with diphtheria is placed should previously be cleared of all needless clothing, carpets, drapery, and other materials likely to harbor the poison of the disease. This room should constantly receive a liberal supply of fresh air, without currents or drafts directly upon the patient. It will be well also to have the sun shine directly into the room.

3. In order that the guardians of public health may have early warning, **it is important that every case of diphtheria be promptly reported to the local board of health.**

"Whenver any *householder* shall know that any person within his family is taken sick with the small-pox, scarlet fever, diphtheria, *or any other disease dangerous to the public health*, he shall immediately *give notice thereof to the board of health*, or to the *health officer* of the township [city or town] in which he resides; and if he refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars."(1)

"Whenever any *physician* shall know that any person whom he is called to visit is infected with the small-pox, scarlet fever, diphtheria, *or any other disease dangerous to the public health*, such physician shall immediately *give notice* thereof to the board of health or health officer of the township [city or town] in which such diseased person may be; and every physician who shall refuse or negect to give such notice, shall forfeit for each offense, a sum not less than fifty nor more than one hundred dollars.(1)

4. **The local board of health** and the physician in charge of cases of this disease should co-operate for its restriction. The board should particularly guard against its spread by cases where no intelligent physician is employed.

"When the small-pox, scarlet fever, diphtheria, *or any other disease dangerous to the public health*, is found to exist in any township [city or town] *the board of health shall use all possible care to prevent the spreading of the infection*, and to *give public notice of infected places* by such means as, in their judgment, shall be most effectual for the common safety."

"Local boards of health should make such regulations as they may deem necessary for the public health and safety respecting any *articles which are capable of*

(1)Local boards should adopt this regulation and give public notice thereof. The board, or any member thereof, may prosecute all violations as provided in section 23, chapter 151, laws of 1880.

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containing or conveying any infection or contagion or of creating any sickness, or when such articles shall be brought into, or conveyed from their township, or into or from any vessel; and if any person shall violate any such regulation he should forfeit a sum not less than twenty dollars."(2)

"The general laws of this State provide that the mayor and aldermen of cities and towns and the trustees of townships 'shall have and exercise all the powers, and perform all the duties of a board of health.' This is in chapter 151, Sec. 13, laws of 1880."

5. The discharges from the throat nose and mouth are extremely liable to communicate the disease, and should be received on soft rags or pieces of cloth which should immediately be burned.

6. The discharges from the kidneys and bowels are also dangerous, and should be passed on old cloths and burned, or into vessels kept thoroughly disinfected by nitrate of lead, chloride of zinc, or sulphate of iron (copperas), and then *buried*, at least 100 feet distant from any well.

Copperas dissolved in as little hot water as will dissolve it is a good disinfectant for this purpose.

7. Nurses and attendants should be required to keep themselves and their patient as clean as possible—their own hands should frequently be washed and disinfected by chlorinated soda, or carbolic acid solution.

8. Soiled bed and body-linen should at once be placed in boiling water or in water containing chlorinated soda, chloride of lime, or solution of chloride of zinc.

9. All persons recovering from diphtheria should be considered dangerous, and therefore no such person should be permitted to associate with others, or to attend school, church, or any public assembly, until in the judgment of a careful and intelligent physician he can do so without endangering others.

10. The body of a person who has died of diphtheria should, as early as practicable, be placed in the coffin, with disinfectants, and the coffin should then be tightly closed. Afterward the body should not be exposed to view except through glass.

11. No public funeral should be held at a house in which there is a case of diphtheria, nor in which a death from diphtheria has recently occurred. No children, at least, and it would be better in most cases that few adults should attend such a funeral.

12. The room in which there has been a case of diphtheria, whether fatal or not should, with all its contents, be thoroughly disinfected by exposure for several hours to strong fumes of chlorine gas, or of burning sulphur, and then, if possible, it should for several days be exposed to currents of fresh air.

To disinfect an ordinary room with chlorine gas: having tightly closed all the openings of the room, place in it an open earthen dish containing four ounces of peroxide of maganese. Pour on this one pound of strong muriatic acid, being careful not to breathe the fumes. When certain that continuous evolution of chlorine is taking place, leave the room and close the door.

To generate sulphuric acid gas, put live coals on top of ashes in a me-

(2) Chapter 151, laws 1880, sections 16, 17, 18, 19, 20, 21, 22.

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tallic pan and place on the coals sulphur in powder or fragments. This is preferable to chlorine gas, for it does not bleach colored cloths and is equally efficacious.

A convenient way is to place the coals and sulphur on a heated stove-plate or cover turned bottom upward in a pan half filled with ashes. To disinfect 100 cubic feet of air requires the thorough burning of about one and a half ounces of sulphur.

13. After a death or recovery from diphtheria, the clothing, bedding, carpets, mats, and other cloths which have been exposed to the contagium of the disease, should either be burned, exposed to superheated steam, to a degree of dry heat equal to 240 degrees F., or be thoroughly boiled.

The foregoing methods of disinfection are applicable in all contagious diseases.

Preventive Measures.—14. Avoid the special contagium of the disease.

15. Beware of crowded assemblies in ill-ventilated rooms.

All influences which depress the vital powers, and vitiate the fluids of the body, tend to promote the development and spread of this disease. Among these influences, perhaps the most common and powerful are *impure air* and *impure water*. Because of this, and as a means of lessening the danger of contracting almost all other diseases, the following precautions should always be taken, but more particularly during the prevalence of any such disease as this.

16. The grounds under and around the house should be well drained.

17. No vegetable or animal matter should be allowed to decompose on the surface of the ground near the house.

18. If any soap-factory, slaughter-house, rendering establishment, or other source of foul odors, contaminate the air which you and your children daily breathe, take immediate measures through your local board of health or health officer, to have such nuisance abated.

19. Your **own privy** especially, should at all times be thoroughly disinfected, by dry earth, coal ashes or copperas-water; and the receptacle should be so constructed as to be water-tight, and to be tightly covered when removed to be emptied, as it should be often enough to prevent the air about it from becoming offensive, and in cold weather so far as possible.

20. Your whole **house** and especially its sleeping-rooms **should be well ventilated.**

21. Your **cellar should be dry** and well ventilated, it should frequently be whitewashed and always kept clear of decomposing vegetable or other substances.

22. No cess-pool should be allowed near the house. If there be one, it should either be removed or be thoroughly and frequently disinfected with sulphate of iron (copperas).

23. Your **house drains** should be looked to with scrupulous care, to see that they are well trapped, kept clear and ventilated into the open air. This ventilation may be secured by a one and one-half inch iron pipe, connected with the sewer pipe between the trap and the main sewer, carried along the chimney or otherwise to the top of the house. This will overcome all difficulties from the inefficiency of traps through overflow of the sewer, or back-water; and also the

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changes of current or draft in chimneys, where the ventilation pipe is simply carried into the chimney at the bottom. If placed inside the chimney it should be carried to the top of the chimney. The latter method is the most desirable mode of ventilation.

24. Your house should not have uninterrupted connection with a sewer. Be sure that the waste-pipes do not permit the entrance of sewer gas into the house, but that they enter the sewer through an open-air space, or at least through a space freely ventilated to the open air.

25. Be sure that your **drinking water** is not contaminated by surface drainage nor by leakage from the drain, gas-pipes, sewer, cess-pool or vault.

In order that the document may do the greatest possible good, it is hoped that each one who receives it will not only make such use of it as will tend to disseminate most widely the suggestions and statements of fact contained therein, but will also *act for the restriction or prevention of this disease* in accordance with its suggestions, or by other effective measures.

[FORM 21B.]

RESTRICTION AND PREVENTION OF SMALL-POX.

Nature of the disease.—Small-pox is prevalent in many parts of the State. It is a part of the history of the disease that it occurs in certain intervals, at periods not absolutely accurate or well defined, but sufficiently distinct to attract attention. This periodicity is largely due to changes in population, rather than any inherent law of the disease. It is formidable and fatal, and believing it to be preventable, the State Board disseminate as widely as possible, among the people of the State, the knowledge of rational means for its restriction.

The specific contagion developed by the disease itself, and by which it spreads, is diffused by the exhalations (breath, perspiration, etc.) of the patient, through the air immediately surrounding him, as well as by clothing or other solid substances that have been brought into contact with the products of the disease.

As a rule, the virulence or malignancy of the contagion is in direct proportion to the severity of the case from which it emanates, though malignant cases may result from exposure to a mild case.

The State Board of Health have adopted and issued the following regulations:

Restriction of the disease.—**Small-pox is a contagious disease,** and hence the strict observance of the following precautions is of very great importance.

1. In order that the guardians of the public health may have early warning, **it is important that every case of small-pox be promptly reported to the local board of health.**

"Whenever any *household* shall know that any person within his family is taken sick with the small-pox, scarlet fever, diphtheria, *or any other disease dangerous to the public health,* he shall immediately *give notice thereof to the board of health,* or to the *health officer* of the township [city or town] in which he resides; and if he shall refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars." (1)

(1) Local boards should adopt this regulation and give public notice thereof. The board, or any members thereof, may prosecute all violations as provided in section 23, chapter 151, laws of 1880.

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"Whenever any *physician* shall know that any person whom he is called to visit is infected with the small-pox, scarlet fever, diphtheria, *or any other disease dangerous to the public health*, such physician shall immediately *give notice* thereof to the board of health or health officer of the township [city or town] in which such diseased person may be; and every physician who shall refuse or neglect to give such notice, shall forfeit for each offense, a sum not less than fifty nor more than one hundred dollars.

2. **The local board of health** and the physician in charge of cases of this disease should co-operate for its restriction. The board must particularly guard against its spread by cases where no intelligent physician is employed.

"When the small-pox, scarlet fever, diphtheria, *or any other disease dangerous to the public health*, is found to exist in any township [city or town] *the board of health shall use all possible care to prevent the spreading of the infection*, and to *give public notice of infected places* by such means as in their judgement shall be most effectual for the common safety."

"Local boards of health must make such regulations as they may deem necessary for the public health and safety respecting any *articles which are capable of containing or conveying any infection or contagion or of creating any sickness*, or when such articles shall be brought into, or conveyed from, their township, or into or from any vessel; and if any person shall violate any such regulation he shall forfeit a sum not less than twenty dollars."

The general laws of this State provide that the mayor and aldermen of cities and towns and the trustees of townships, "shall have and exercise all the powers and perform all the duties of a board of health." *Chapter 151, section 13, laws of 1880.*(2)

3. Upon notice being given of cases of small-pox or varioloid to the board of health of a township, city or town, or to the health physician thereof, or whenever any member of said board, or the health physician shall have knowledge of any cases of small-pox or varioloid within their jurisdiction, some member of the board, or the health physician, shall cause a *yellow* cloth, or card having small-pox conspicuously printed thereon, not less than six inches square to be fastened upon the front door, or other conspicuous place of each building in which sickness prevails, said cloth or card to be maintained during the existence of the disease, and until such time as the health physician is satisfied the premises have been properly cleaned, disinfected and purified. If said yellow cloth or card is removed without authority from the health physician, the name of the person, or the head of the family, occupying the premises, together with the number of the street or location, shall be published, and the person removing said cloth or card, or causing their removal without authority of the health physician, shall be fined a sum not less than fifty nor more than one hundred dollars.

4. Every person affected with small-pox or varioloid, shall be isolated as much as possible from all other persons, and shall occupy a room in which there are no unnecessary articles of furniture, as carpets, cushioned chairs, lounges, window curtains, clothing, etc. The rooms which have been occupied by such diseased

(2) The Attorney-general decides that section 13 is mandatory, and it makes it compulsory upon the officers therein named to perform all the duties of a board of health, in accordance with the object and intent of the law. A refusal or neglect to comply with the statute renders them liable to indictment for misdemeanor.

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person should, if papered, have the paper removed entirely from the walls; the walls should be whitewashed; the floor scrubbed; the room thoroughly fumigated, disinfected and ventilated before permission is granted to remove the yellow cloth or card of warning.

5. No person recovering from small-pox shall be permitted to appear on the public streets of any city or town, or the public highway of any township, or in any public place, until he or she is provided with a certificate from the attending physician, or health physician of the board of health, of such township, city or town, that all danger from contagion, by reason of such disease, is passed.

6. Every person dying of small-pox should be thoroughly washed with a zinc solution, of double strength, then be wrapped in a sheet wet with the zinc solution placed in as tight coffin as possible, and buried immediately.

7. No public funeral shall be held at a house where there is a case of small-pox or varioloid; nor in which a death from small-pox has recently occurred.

8. The room in which there has been a case of small-pox or varioloid must be thoroughly disinfected immediately.

*Instructions for disinfection.** 9. It is extremely important that the people should be instructed with regard to disinfection. They must be taught that no reliance can be placed on disinfectants simply because they smell of chlorine or carbolic acid, or possess the color of permanganate, and that, in general, proprietary disinfectants with high sounding names are practically worthless, as they either have no value whatever, or if of value cost many times as much they are worth, and cannot be used in sufficient quantity.

Disinfection is the destruction of the poisons of infectious and contagious diseases.

Deodorizers, or substances which destroy smells, are not necessarily disinfectants, and disinfectants do not necsssarily have an odor.

Disinfection cannot compensate for want of cleanliness or of ventilation.

10. **Disinfectants to be employed.**—1. Roll sulphur (brimstone) for fumigation.

2. Sulphate of iron (copperas) dissolved in water in the proportion of one and and a half pounds to the gallon; for soil, sewers, etc.

3. (Zinc solution) sulphate of zinc and common salt, dissolved together in water in the proportions of four ounces sulphate and two ounces salt to the gallon; for clothing, bed-linen, etc. (3)

11. **How to use disinfectants in the sick-room.**—*The most available agents are fresh air and cleanliness.* The clothing, towels, bed-linen, etc., should at once, on removal from the patient, and before they are taken from the room, be placed in a pail or tub of the zinc solution, *boiling hot*, if possible.

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*Prepared by the National Board of Health.

(3) NOTE.—Carbolic acid is not included in the above list for the following reasons: It is very difficult to determine the quality of the commercial article, and the purchaser can never be certain of securing it of proper strength; it is expensive, when of good quality, and experience has shown that it must be employed in comparatively large quantities to be of any use; it is liable by its strong odor to give a false sense of security.

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All discharges should either be received in vessels containing copperas solution, or, when this is impracticable, should be immediately covered with copperas solution. All vessels used about the patient should be cleansed with the same solution.

Unnecessary furniture—especially that which is stuffed—carpets and hangings, when possible, should be removed from the room at the outset; otherwise, they should remain for subsequent fumigation and treatment.

12. **Fumigation** with sulphur is the only practical method for disinfecting the house, for this purpose the rooms to be disinfected must be vacated. Heavy clothing, blankets, bedding, and other articles which cannot be treated with zinc solution, should be opened and exposed during fumigation, as directed below. Close the rooms as tightly as possible, place the sulphur in iron pans supported upon bricks placed in wash-tubs containing a little water, set it on fire by hot coals or with the aid of a spoonful of alcohol, and allow the room to remain closed for twenty-four hours. For a room about ten feet square, at least two pounds of sulphur should be used; for larger rooms, proportionately increased quantities.

13. **Premises.**—Cellars, yards, stables, gutters, privies, cess-pools, water-closets, drains, sewers, etc., should be frequently and liberally treated with copperas solution. The copperas solution is easily prepared by hanging a basket containg about sixty pounds of copperas in a barrel of water, or by dissolving in hot water a few pounds of copperas.

14. **Body and bed clothing, etc.**—It is *best* to burn all articles which have been in contact with persons sick with contagious or infectious diseases (and especially if the disease be small-pox). Articles too valuable to be destroyed should be treated as follows:

a. Cotton, linen, flannels, blankets, etc., should be treated with the boiling-hot zinc solution, introducing piece by piece; secure thorough wetting, and boil for at least half an hour.

b. Heavy woolen clothing, silks, furs, stuffed bed-covers, beds, and other articles which cannot be treated with the zinc solution, should be hung in the room during fumigation, their surfaces thoroughly exposed, and pockets being turned inside out. Afterward they should be hung in the open air, beaten and shaken. Pillows, beds, stuffed mattresses, upholstered furniture, etc., should be cut open, the contents spread out and thoroughly fumigated. Carpets are best fumigated on the floor, but should afterward be removed to the open air and thoroughly beaten.

15. To disinfect an ordinary room with chlorine gas: having tightly closed all the openings of the room, place in it an open earthen dish containing four ounces of peroxide of manganese. Pour on this one pound of strong muriatic acid, being careful not to breathe the fumes. When certain that continuous evolution of chlorine is taking place, leave the room and close the door.

Preventive measures.—The only safety against small-pox is, to-wit:

16. **Avoid the special contagion of the disease, and vaccinate.**

17. **Vaccination.**—When successfully performed, with reliable virus, vaccination undoubtedly modifies, if it does not furnish absolute protection from small-pox; but in view of the fact that there are many instances in which the vaccine disease (for some cause) does not pass regularly through all its stages, thereby

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becoming a spurious vaccination, the State Board earnestly recommend the **re-vaccination of all persons, old and young, who are not known to have been successfully vaccinated** at some former time. More especially should this precaution be taken during the prevalence of small-pox in a neighborhood. By the observance of this rule, and primary vaccination in youth, one of the most loathsome diseases may be effectually prevented. The State Board, therefore, strongly recommends vaccination. For this purpose non-humanized virus, or that taken directly from the cow, is most reliable, and is recommended. If that cannot be obtained, humanized virus, obtained from the arm of a healthy child, may be used. Properly done, with due precaution as to the health, vigor and age of the subject, and the source of the virus used, vaccination may be affirmed to be without danger.

18. In vaccine disease, or cow-pox, the period of incubation or development from exposure to eruption is four to six days; in small-pox it is seven to fourteen days. Hence, if vaccine virus be inserted immediately after exposure to small-pox, its shorter incubative period will anticipate the other, and if it do not prevent it altogether will so modify it as to deprive it of its greatest danger. **Immediate vaccination after exposure is important for safety.**

In order to secure a better understanding of the powers and duties of local boards, the State Board at its meeting in November, 1881, authorized the publication of the following circular:

[Form 14B.] CIRCULAR TO CLERKS AND HEALTH PHYSICIANS OF LOCAL BOARDS.

Office of the Secretary
OF THE STATE BOARD OF HEALTH,
Des Moines, November 12, 1880.

Reports from officers.—An examination of the blanks for reports of this Board will show that provisions are made for placing upon record a great many statements of conditions existing within the jurisdiction of the several local boards of health in Iowa, and also the facts relative to the prevalence and fatality of certain diseases. A large number of these have been filled out and returned to this office by clerks of local boards, and thus much material collected which will eventually be of value in forming conclusions as to the conditions which, favorably or unfavorably, influence health and disease.

This is not accomplished, when properly done, without considerable labor by clerks and others who contribute to this collection. Many clerks report that the trustees or council have never met, nor organized as a board of health, and hence it would seem these clerks of local boards have performed these duties without reference to compensation.

A large amount of correspondence is forced upon the office of the State Board by the reluctance of township trustees and city councils, and of local boards to comply with the law. The statute is very plain.*

*Chap. 151, Sec. 15, Laws 1880.

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SEC. 15. It shall be the duty of the health physician of every incorporated town, and also the clerk of the local board of health in each city or incorporated town or village in the State, at least once a year to report to the State Board of Health their proceedings, and such other facts required *on blanks* and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health.

The health physician.—Although the law provides for reports from health physicians of all local boards, reports have not been received with much regularity or uniformity. In fact, a large majority of blanks intended for health physicians are returned by the clerk in direct contravention of the instructions accompanying each blank. Form 1C is intended exclusively for the health physician, and form 2C exclusively for the clerk. By circular issued from this office in June, clerks were requested to send notice to this office at once of the appointment of health physicians by their local boards, giving their name and post-office address. This instruction has been very extensively ignored or forgotten. Hence, information of value, so far as it relates to diseases and causes of death, which could be obtained more fully and satisfactorily from such physicians if they were appointed, as they should be, has not been, and could not be procured. The duty of local boards relative to the appointment of a health physician is imperative. The law is mandatory, not advisory. It says they *shall* appoint one.

SEC. 14. Every local board of health *shall* appoint a competent physician to the board, who shall be the health officer within its jurisdiction, and shall hold his office during the pleasure of the board.

Clerks of local boards.—The statute requires every clerk of a township, city or town, to make a report, as clerk of the local board of health, to the State Board, whether there has been organized in the city, town or township, a board of health or not, or without reference to whether he has, or has not, received any notice of contagious diseases, or reports from those who should report to him. It is expected the clerk will ascertain in some manner the "facts required," and report them as accurately as possible. Yet clerks persist in returning their blanks not filled out, and with them a letter saying: "No cases have been reported to this office, and I have nothing to report." They will then go on to say: "There have been no epidemic diseases in this township the past year; no deaths. The health generally of the people, owing to general cleanliness, pure air, good water and drainage, has been unusually good." Now, this conveys very much of the intelligence desired on the blanks, and it should be placed there, so that it could be properly filed and readily referred to. To read all such letters involves time, and to keep trace of letters, scraps of paper and postal cards, is nearly impossible. Some clerks neglect to insert the name of their city, town or township, giving only their name; and the post-office stamp, which is very uncertain in most cases, is the only means of ascertaining where the return came from. Some give the name of the location, but omit their signature and post-office address.

Some clerks return the blanks not filled out, but write, saying: "There is no board of health in this city [or township]." In every city, town or township in the State there exists by law a local board of health.

SEC. 13. The mayor and aldermen of each incorporated city, the mayor and council of any incorporated town or village in the State, or the trustees of any township, *shall* have and exercise all the

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powers and perform all the duties of a board of health within the limits of the cities, towns and townships of which they are officers.*

Local boards of health, therefore, existing by positive enactment, the clerks of such boards are required to report to the State Board, whether the officers of the city, town or township, perform their duty or not. The framers of the law evidently presumed the clerk of a township has, necessarily, some general knowledge of the conditions and occurrences in his own township, and it is reasonable to suppose, although no official report has been made to him, his facilities for obtaining information in his township are such as to enable him to make a very full and satisfactory report of the facts as they exist. The blanks are so arranged that when he cannot give positive information he may give his opinion, based on his knowledge and best judgment. If clerks will bear this in mind, and so make their returns *on the blanks*, they will save a vast amount of trouble and labor in the office of the State Board, and materially aid the cause for which the law was established. It should be remembered that there are over three thousand clerks in the State, and irregularities which may seem trivial in a single case amount to considerable in the aggregate. They should bear in mind, also, that it is just as important to report the fact that no sickness or deaths have occurred as to report a large number. This information is important to this office as showing when and under what conditions there is exemption from diseases. The object of the State Board is to ascertain why diseases are more prevalent in one locality than another, and, if possible, remove the causes where they exist. With the hearty, prompt co-operation of local boards it is possible to do much, if only the need therefor is made plain.

The reports of clerks of local boards are a part of the records of the State Board, as a part of the lasting records of the facts to which they relate in the several cities, towns and townships of Iowa, at the time they were made, to be kept for future reference and comparison with future conditions which arise respecting their locality. This fact alone should stimulate clerks and officers of local boards to contribute all that is possible to be obtained, so that when it is wanted it will be valuable and reliable, and furnish a firm foundation on which to build up knowledge which shall aid to prevent sickness and death. Therefore, make your report on the blanks furnished by the State Board, whatever it may be, and send nothing on postal cards, scraps of paper, or by letter, pertaining to health, unless it be as a special report, when the regular report is not due, *and report only cases of contagious diseases at any time. Do not use the health physican's blank which is Form 1C.*

Where a township clerk is also clerk of a city or town, he must keep a separate record for each, and so report to this office.

The clerk's records.—Many clerks inquire how they are to obtain the reports of cases of contagious diseases, with which to make the record. The law gives the local boards power to make such regulations regarding the cause of sickness as they deem necessary.

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*Chap. 151, Sec. 13, Laws 1880.

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SEC. 16. Local boards of health shall make such regulations respecting nuisances, sources of filth and *causes of sickness* within their jurisdiction, and on board any boats in their ports or harbors, as they shall judge necessary for the public health and safety; if any person shall violate any such regulations, he shall forfeit a sum of not less than twenty-five dollars ($25) for every day during which he knowingly violates or disregards said rules and regulations, to be recovered before any justice of the peace or other court of competent jurisdiction.*

It is clearly the object of the law, and duty of local boards under the law, to protect the people from the ravages of contagious diseases, and they should possess the earliest possible moment information of the presence of such diseases within their jurisdiction. The State Board of Health, therefore, recommend the adoption of regulations by local boards; to-wit,

Whenever any physician shall know that any person whom he is called upon to visit, is infected with small-pox, scarlet fever, or any other disease dangerous to the public health, he shall immediately give notice thereof to the board of health or health physicians of the city, town, or township (as the case may be) in which such diseased persons may be.

Whenever any householder shall know that any person within his family is taken sick with small-pox, scarlet fever or any other disease dangerous to the public health, he shall immediately give notice thereof to the board of health or to the health physician of the city, town or township (as the case may be), in which he resides, and, until instructions are received from the board of health or the health physician, no clothing or other articles that may have been exposed to infection, shall be removed from the house until thoroughly disinfected.†

The penalty for violation of these regulations should be such as would secure compliance therewith, and appear to be fixed by the last clause of section 16, chapter 151, laws of 1880.

These regulations should be given extensively to the public, and it is believed that so soon as the people thoroughly understand that it is absolutely essential to the proper protection of the community that prompt notice be given of contagious and dangerous diseases, they will not hesitate to take all possible means to protect their neighbors from the danger of suffering and death.

When the board of health has received notice of dangerous diseases, their duties have just begun. They should act promptly and vigorously to thoroughly restrict and prevent any further spread of the disease. To this end the State Board has adopted rules and regulations which will be sent to all local boards of health.

Immediately on the outbreak of an epidemic, notice should be given by the clerk to this office, in order that its progress and decline may be studied. The health physician should also make careful study of epidemics within his jurisdiction, and report all facts to the State Board. Where there is a town or city within a township, the township board has no jurisdiction in such city or town.

Records.—Local boards of health should keep a record of all proceedings separate and distinct from all proceedings as city council, or township trustees, as their organization as board of health is under a special law, and the legality of their proceedings can only be shown as evidenced by record. These records may be obtained of blank book makers throughout the State generally, made from forms prepared by the State Board at one dollar per quire, bound with a record for pro-

*Chap. 151, Sec. 16, Laws 1880.

†These rules are based on the regulations adopted by the board of health of Wakefield, Massachusetts.

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ceedings in front, and for contagious diseases in the back. The health physician should also be supplied a record like the clerk's, in which to record the history and cases of contagious diseases. Cities and incorporated town boards of health may adopt the ordinances of their city or town as the regulations of their board, and the person who violates the regulations of a local city or town board, when so adopted, may be said to commit two offenses, one against the ordinances of the city, and one against the laws of the State, and the prosecution for a violation of the regulations may be by the city, and in its name; or by the board, or by any member thereof, under the State law.

All fines and penalties recovered for violation of chapter 151, laws of 1880, are, in the opinion of the Attorney-general, like all other fines and penalties, to be paid into the county treasury and set apart as a special fund for the benefit of the township where recovered.

Expenses of local boards.—Many clerks have written this office inquiring how the expenses of local boards are to be paid. While it is true chapter 151 makes no provision for the expenses of township boards of health, the Code of 1873 makes ample provision therefor. Local boards have power under section 14, chapter 151, laws of 1880, to regulate all fees and charges of persons employed by them in the execution of the health laws and of their regulations. The Attorney-general decides that sections 420 and 3808, are not affected by the repealing section 25, chapter 151, laws of 1880, and are still in force; to-wit,

SECTION 420. All expenses now or hereafter incurred by the trustees of a township in the exercise of the powers heretofore or herein conferred, shall be borne by the township. The trustees shall certify the amount required to pay such expenses to the board of supervisors of the county, and that board, shall at the time it levies the general taxes, and in addition thereto, levy on the property of the township a sufficient tax to pay the amount so certified by the trustees. The tax so levied shall be collected by the county treasurer with other taxes, and be by him paid over to the township clerk. (Code 1873.)

SEC. 3808. The township trustees shall receive:

For each day's service of eight hours necessarily engaged in official business, to be paid out of the county treasury, to each trustee, two dollars. (Code 1873.)

The certificate or the amount required to pay the expenses of the board may be in the following form, and should be signed by all the trustees of the township:

.....county, Iowa, } ss
.....township. }

To the Board of Supervisors of.....county, Iowa:

We, the undersigned, trustees of said township, hereby certify to the board of supervisors of said county, that we, as a board of health of said township, have made regulations for the protection of the public health of said township, and that the expenses now and hereafter to be incurred in the exercise of our powers as such board of health is $...., and we request you at the time of the levy of the general taxes, and in addition thereto, to levy on the property of said township a sufficient amount to pay said sum or so much thereof as may be necessary in addition to the penalty fund set apart for this township, as provided in Sec. 8, chapter 151, laws of 1880.

A—— B——
C—— D——
E—— F——
Trustees.

Dated.....day of.....18....

Duties and power of health physicians.—The health physician of a local board is not a member of the board. His powers and duties, when not expressly stated

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in the statute, are only such as are conferred by action of the board. They should, therefore, be fully and clearly defined, that his action in enforcing the regulations of the board may be of legal force and effect. He is the advising counsel of the board in sanitary matters. When appointed for more than one city, town or township, he must make a separate report for each to the State Board.

Notice of regulations.—All regulations adopted by a township board of health should be published or posted. The rule for this is found in section 416 of the Code of 1873, which, in the opinion of the Attorney-general, is in force; to-wit,

"Notice shall be given of all regulations made by publishing the same in a newspaper published in the township, or where there is no newspaper, by posting in five public places therein."

A large number of clerks nave notified this office that the township trustees and city or town councils have not organized as a board of health, or that they have met and adjourned without adopting any regulations or rules. Section 24, Chap. 151, laws of 1880, says local boards *shall* meet for the transaction of business in May and November of each year, and section 16 says they shall make such regulations respecting nuisances and causes of sickness as they shall judge necessary for the public health. The presumption of the law is that they will perform all the duties contemplated by the statute to protect the community within their jurisdiction from contagious and infectious diseases, and from all causes of sickness within their power. Short of this, they have not complied with the object and intent of the law. To assume that contagious and dangerous diseases or causes of sickness do not exist, is no assurance that they will not exist, and the people for whose benefit the laws were enacted have the right to demand that the proper authorities shall perform their duty and afford them the immunities contemplated by the statute for their restriction and prevention.

Correspondence.—In returning blanks to this office, be careful to insert the name of your township and county, and sign your name, with post-office address, *place the blank in an unsealed envelope, affix a one cent stamp and address it to* "State Board of Health, Des Moines, Iowa."* In writing to this office, always give your post-office address, township and county, as there are many townships of the same name in different counties, and post-office stamps are frequently illegible.

Preserve all circulars received from this office and deliver them to your successor in office.

In ordering blanks or circulars from this office, give the number of the form, and then you will get just what you want.

Very respectfully,

L. F. ANDREWS,
Secretary.

By order of the State Board.

Immediately after chapter 151, laws of 1880, went into effect, nu-

*Since this circular was issued the Post-office Department has decided that blanks partly printed and partly written are subject to letter postage.

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merous inquiries were made, as to how the expenses of local boards were to be paid, said chapter making no provision therefor. The following letter was sent to the Attorney-general requesting his opinion thereon:

IOWA STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
June 24, 1880.

J. F. MCJUNKIN, *Attorney-general:*

DEAR SIR: I desire your opinion respecting the expenses of local boards of health under section 14, Chap. 151, laws of 1880. The law is mandatory, requiring the performance of certain duties. No provision is made for compensation for such service. The law also provides, in sections 16 and 17, for the recovery of certain penalties, but does not say to whom such penalties shall be paid when recovered. Is it not the presumption of law that all fines and penalties recovered under this law before justices of the peace and other courts shall be paid into the county treasury?

I find our board of health law is nearly identical with Sec. 415 *et seq.* of the Code of 1873. Section 420, you will see, provides how the expenses of township trustees, acting as a board of health, shall be paid. Section 3808 provides that such trustees, when engaged in official business, shall receive two dollars per day, to be paid out of the county treasury.

The repealing clause of Sec. 25, Chap. 151, laws of 1880, repeals only so much of existing laws as in conflict therewith. I am of the opinion Secs. 416 and 420 of the Code are still in force.

In reply to the foregoing the following was received:

IOWA STATE BOARD OF HEALTH,
OFFICE OF THE ATTORNEY-GENERAL,
WASHINGTON, June 28, 1881.

L. F. ANDREWS, *Secretary State Board of Health:*

DEAR SIR:—Your ideas as to how the township trustees are to be paid are correct. The expenses of local boards of health are to be borne as other expenses of the township. The fines and penalties are, like all fines and penalties, to be paid into the county treasury.

Respectfully yours,

J. F. MCJUNKIN.

SEWERAGE, DRAINAGE AND DISPOSAL OF EXCRETA.

The records of the Registrar-General show that in England and Scotland the life of the people gains from twenty to twenty-five per cent in five years, and suffer less than half the average sickness and disability in the well drained districts. Based upon computations made from the vital statistics of sixty-three of the healthiest districts in England, Dr. William Farr says: "Industry and the army receive their

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best recruits from this population, while they get their worst from the low parts of sickly towns." Very little drainage has been done in Iowa, except to increase the product of land, yet, wherever drainage is profitable in a monetary direction, it is equally profitable in a hygienic direction to all animal life living upon the land.

Diseases, caused more or less by defective drainage, are malarial fevers, dysentery, enteric (typhoid) fever, diphtheria, cerebro-spinal meningitis, cholera Asiatica, and phthisis pulmonalis (consumption). Enteric fever may be said to live on the decomposition of animal and vegetable matter, and the dissemination in the air and water, of animal excrement, while a milder form of the disease, known as typho-malarial, is induced by decomposing wood, rotting building-sills and cellar-floors, and decaying vegetables.

To secure information from different sections of the State for the use of the Committee on Drainage, Sewerage and Disposal of Excreta, and for dissemination of information among the people upon these very important subjects, the following circular was issued:

DEAR SIR—In the preparation of a paper upon Healthful Homes, for the State Board of Health, the Committee on Sewerage, Drainage, and Disposition of Excreta, is desirous of obtaining information upon the following points, and will feel under obligations to those correspondents of the Board who will consider them and communicate with the Committee:

1. What is the nature of the soil and the geological formation in your location?
2. What is the practice in your neighborhood in regard to the use of tile-draining the ground upon which the dwelling is erected?
3. What, in your opinion, is required to render a house and its surroundings healthful in your locality?
4. What has been your experience in regard to the location of dwellings in your vicinity as regards immunity of families from different forms of disease?
5. From what source do the inhabitants obtain their drinking water, and that used in cooking? If from wells, what is their average depth? In what manner are they constructed? Are they liable to receive surface water?
6. Do the houses usually have cellars, and if so, are they walled with stone, ventilated, clean, and free from water?
7. What is the usual mode of disposing of the animal excrement, or fœcal and urinary matter?
8. What is the usual mode of disposing of waste water and kitchen wash?
9. Please give your views upon any matters pertaining to the construction and maintenance of sewers and drains.

N. B.—Please forward your reply within two weeks, if convenient, to

JAMES L. LORING,
Civil Engineer Iowa State Board of Health.

DALLAS CENTER, IOWA, May 20th, 1880.

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At the November meeting Mr. Loring, of the Committee on Sewerage, Drainage and Disposal of Excreta, presented a report which was adopted and twenty-five hundred copies ordered printed for distribution. The report is given in another part of this report.

WATER SUPPLY.

The collection of facts from the State at large relating to the water supply is recognized as of great importance, and to inaugurate a plan which will be enlarged in its scope as the years go on, the following circular was issued by the Committee on Water Supply, and sent to the principal cities of the State:

DES MOINES, June 10, 1880.

DEAR SIR:—The State Board of Health desire information regarding the water supply of cities in this State. Will you answer the following interrogatories relative to your city:

1. What is the source of water supply?
2. Is the water filtered before entering pipes?
3. Are there any sources of contamination above the main pipes, as sewers, drainage from woolen-mills, slaughter-houses, etc? If so, of what nature?
4. Has any analysis of the water been made? If so, give it.

Any other statements regarding your water supply, its purity, etc., will be thankfully received.

Very respectfully,
W. H. DICKINSON,
Committee on Water Supply.

The replies were made direct to the Committee, and will be found in the report of the Committee. Incidentally, however, much information may be gathered on this subject from special correspondents in reply to circular 23B. It is hoped that information will be secured on this subject so as to make possible a satisfactory statement of the condition in any part of the State.

PLEURO-PNEUMONIA AMONG CATTLE.

Early in the month of March, 1881, rumors were rife that *pleuro-pneumonia* had made its appearance in various sections of the State. In Taylor county, and also in Clinton county, it was reported as seriously decimating cattle. In the absence of special statutes upon that subject, securing immunity or protection from that disease, I wrote the Attorney-general, asking his opinion thereon; to-wit,

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IOWA STATE BOARD OF HEALTH,
SECRETARY'S OFFICE, March 14, 1881.

HON. SMITH MCPHERSON, *Attorney-general:*

MY DEAR SIR: Much alarm exists throughout the State regarding the probable presence of *pleuro-pneumonia* among cattle, introduced into the State by a large lot of calves brought from the East last fall, and distributed over the State. Large numbers of them have died, and the cause has been pronounced by some veterinary surgeons to be *pleuro-pneumonia*, a fatal, and terribly contagious disease. The effect of the disease upon the flesh of cattle used for food must largely increase the mortality list. In England, it is reported, the increase from eating the flesh of cattle thus diseased, has been, since 1842, when the disease appeared there, from 1 to 5.8. It appears to me that this disease comes within the powers of the State Board of Health to regulate and control, as one affecting "the lives and health of the people." Upon this question I would call your attention to the first clause of Sec. 2, Chap. 151, Laws of 1880, and request your opinion thereon.

In the absence of any special legislation upon the subject, if any protection to the people can be had to promptly stamp out this disease, if it exists, it must come through the powers granted in said Chap. 151. An early answer is solicited, as whatever is done, must be immediately.

Very truly,
L. F. ANDREWS, *Secretary.*

Owing to the demands of official business a reply was not made until April 9th. In the meantime, action had been taken in another direction, as will be seen hereafter. The following is the reply of the Attorney-general:

STATE OF IOWA,
OFFICE OF ATTORNEY-GENERAL,
RED OAK, April 9, 1881.

L. F. ANDREWS, *Secretary State Board of Health, Des Moines:*

DEAR SIR—Your letter of the 11th ult., asking whether, in my opinion, the Board could cause to be destroyed cattle affected with *pleuro-pneumonia* ought to have been answered earlier, but official business of great importance has prevented. As I learn, from newspaper reports, the importance of this matter is at least in a state of suspension, the rumors and belief that this disease existed in Clinton county being dispelled by a personal examination by Dr. Robertson, assisted by a veterinary surgeon of high standing.

That this disease is contagious, and most alarming and fearful in consequence, is no longer debatable. That the use of meats and milk from animals affected with this disease has largely increased the death rate in those sections where the disease has prevailed, is well and conclusively authenticated. In both England and Scotland the death rate has increased from 1 to 5.8 in 10,000 deaths since this disease was there introduced.

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"Since the introduction of the disease into Great Britain, in 1842, the mortality from carbuncles has increased in England from 1 to 5.8, and that from phlegm from 2.5 to 8.1 in 10,000 deaths. A similar fact has been noticed with regard to Scotland, and in both cases the increased mortality has been ascribed to the fact that so much of the diseased meat had been eaten."

"Prof. Gamgee states that in a convict establishment, where such animal food was eaten, there occurred 40 or 50 carbuncles a month among 1,520 prisoners."

"Dr. Livingston asserts he has seen very serious illness caused by eating the flesh of cattle that had been so slightly sick with *pleuro-pneumonia* that the disease was hardly noticeable, and the flesh was apparently sound. In these cases the virus was not destroyed by thorough cooking.—*Sixth Annual Report, Massachusetts State Board of Health, 1870, p. 109.*

"In England the disease has more than doubled the ordinary mortality of this country."—*Dr. James Law Department of Agriculture, Washington, D. C., Special Report, No. 12, p. 243.*

"All meat, from whatever source it may come, that would cause sickness, disease or death in man, if partaken as food, must be regarded in the light of sanitary science as *diseased*, and consequently unfit for human use in any form. Hence a disease in which a contagious virus is developed during its course, or a virulent principle generated in the blood, renders the meat from all such animals thus affected exceedingly dangerous as an article of food. Tuberculous deposits upon the pleural membrane lining the chest cavity, thus causing the lungs to adhere to the ribs or along the internal walls of the abdomen, are sufficient evidence to condemn the carcass. It is conceded by pathologists that the bovine form of tuberculosis is identical with that of man."—*Noah Cressy, M. D., V. S., Ph. D., Hartford, Conn.*

"This disease in cattle is very infectious; the presence of a specific virus is evident; the flesh of such diseased animals, under certain circumstances, and also the milk, possesses infective properties."—*Prof. Gerlack, Berlin Veterinary School.*

"When we see thousands of tubercular deposits in a single slaughtered animal, we are forced to conclude that the use of such meat can in no way promote our healthfulness."—*Thomas Walley, Principal Edinburg Royal Veterinary College.*

"That tuberculosis of cattle can be conveyed not only to cattle but to other species of animals, is an established fact. There is, therefore, every reason to prohibit the use of milk from cows affected with tuberculosis, and especially for infants, whose powers of absorption are very active. The part this liquid has played in the production of *tabes mesentrica*, or tuberculosis, in the bowels, from which many children have died, has rarely been suspected."—*George Fleming, Veterinary Inspector to the British Army, and F. R. C. V. S.*

"The milk of such animals has a pre-eminently contagious influence. Such milk, even when boiled, still retains its injurious properties."—*Otto Bollinger, University of Munich.*

"This milk contains a specific virus that can be transmitted to man."—*Prof. Gerlach.*

"But twenty-five per cent of the cases of consumption in man are due to hereditary transmission. The other seventy-five per cent are caused by unsanitary

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influences. The origin of more or less of this large percentage is doubtless due to infection from meat or milk."—*C. W. Chamberlain, M. D., Hartford, Conn.*

That the presence of this disease, in some localities, is a matter of the highest concern to stock-raisers and the farmers generally from a financial standpoint, and to the country at large from a sanitary standpoint, cannot be questioned, after reading the authorities above quoted. I have cited these authorities for the purpose of calling attention to this subject that it may receive the attention which it now, or, in all probability, soon will, demand.

But, of course, this does not dispose of the question suggested by you. The powers of the board are those only conferred by the statute. Unless the powers are given by chapter 151, laws of 1880, they do not exist at all. In my opinion, the only claim for such authority is the first paragraph of section 2, of said act, which is:

"The State Board shall have the general supervision of the health and life of the citizens of the State."

I have no doubt but that under this section and other parts of the statute the power exists to prevent the use of meat supposed to be diseased; or, in case the disease reached the form of an epidemic, to prevent *in toto* the use of any beef, or milk from the cow. To my mind, that is clearly conferred. But the power to destroy the animals I do not believe is conferred. That would be a construction that is scarcely warranted. Tribunals of the character of the board cannot claim to exercise powers not clearly given.

Yours very truly,

SMITH MCPHERSON,
Attorney-general.

That the people were restive and uneasy, regarding the supposed presence of this disease is evidenced by the following correspondence and reports:

WHEATLAND, IOWA, March 11, 1881.

HON. J. H. GEAR, *Governor of Iowa, Des Moines:*

DEAR SIR—I have the honor to report to you (deeming it expedient from your published circular letters to the auditor of Scott county), that in the month of October, 1880, I purchased at Chicago fifty-seven head of calves, said to have come from Michigan, brought them here and put them with some I had raised from my own cows here; making together, eighty head. All seemed healthy together until the second day of this month, when some of them gave signs of disease. I called upon our veterinary surgeon here, who pronounced the disease *pleuro-pneumonia*. At this date ten head have died, and all of them show signs of the disease and the chances are that most of them will die; and if any live until the pasture season, will be liable to spread the disease, not only to the balance of my own herd, but also to my neighborhood and throughout the country. Can the State give any assistance in the matter.

Yours, etc.,

N. DAVISSON.

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THE STATE OF IOWA,
EXECUTIVE DEPARTMENT,
DES MOINES, March 14, 1871.

DR. W. S. ROBERTSON, *Muscatine, Iowa*:

DEAR SIR—I am in receipt of a letter from Wheatland, Clinton county, a copy of which I enclose you.

On the receipt of this I wish you to go *at once* to Clinton, to confer with the county authorities of that county, to whom I have written.

Should the facts set forth in the letter be found to be true, I think there is ample authority under chapter 151, acts of the Eighteenth General Assembly, to empower the Board, of which you are president, to act. If the *pleuro-pneumonia* is really found to exist, take prompt measures to *stamp it out*. The county authorities should promptly co-operate with you in this matter, and I think the next General Assembly will, beyond question, make an appropriation to meet any loss occasioned in eradicating this dread disease. I need not say to you how great the loss to Iowa would be if this scourge should spread among the cattle of the State. It could only be computed by millions.

I would suggest that you give no publicity to this matter until you examine into it fully.

Yours truly,

JNO. H. GEAR.

REPORT OF DR. ROBERTSON.

STATE BOARD OF HEALTH,
OFFICE OF THE PRESIDENT,
MUSCATINE, IOWA, March 19, 1881.

HON. JNO. H. GEAR, *Governor of Iowa:*

DEAR SIR—In compliance with your order of the 14th inst., I went to Wheatland, Clinton county, Iowa, to investigate the condition of the herd of calves of Mr. N. Davisson, said to have *pleuro-pneumonia*.

I found the sanitary condition of the herd bad—almost in the extreme. They have probably been fed enough, but not in such away as to do the greatest amount of good. I find their stables unventilated and foul from excrementitious deposit; for instance, I was told that *thirty-five* head of calves (coming yearling) slept in a place in the barn about twelve feet wide and thirty feet long and eight or nine feet high; a shed standing with the end to the barn (two openings into it) about the same size, closed on one side and end and open to the east with the eaves high enough to allow a calf to walk under it, furnished sleeping room for another lot and a shelter through the day. Another lot slept in the basement of the barn, which the sons reported "as too dirty to go into." I saw the herd about 8 o'clock A. M.; the calves were eating hay in an open lot near this open shed, and their hair was yet damp from the condensation of their breath in the unventilated sleeping apartment. Hay was fed from the ground without racks or boxes, and was trampled under foot by the constantly shifting herd as they push each other about. The skeletons (carcasses half consumed of dead calves) lay among the living, no means having been taken to destroy or dispose of any dead animals, except as they were eaten by the hogs occupying the same lot. Dr. Cook, of Wheatland, having seen the lungs of some of the calves which died a few days before my visit, and Dr. Bulenberg, the veterinary who had sometimes prescribed for, and pronounced the disease *pleuro-pneumonia*, were requested to accompany me, and assist in an examination which I proposed to make, that I might have their opinions as to the comparative condition of the lungs of the animal killed, and those which died of the disease in question. Mr. Davisson promptly consented to the proposed examination, his sons selecting several calves which they believed to be coming down with the disease that had affected those which had died; from this selection we chose a calf suppose to have the typical symptoms and killed it. While I have never seen a case of *pleuro-pneumonia* in cattle, I am glad to be able to say that I did not find the pathological condition of the lungs and pleural surfaces, which we find in that disease in the human subject, but did find quite extensive

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tuberculization of the lungs, with one or two small circumscribed abscesses. The pleura covering the lungs, the chest wall and the diaphragm, was healthy. The heart, the liver, the spleen and the kidneys were normal.

The veterinary surgeon in his report stated that the lungs were dark, soft and offensive, *hence* he called the disease "*pleuro-pneumonia.*" I need hardly say, that this condition may be recognized as *gangrene* of the lungs and is not of necessity—*or at all*—pleuro-pneumonia. These calves belong to that class known as "skim-milk, or buttermilk calves"—in other words, animals which from being weaned at an early age, subsequently poorly fed upon slops and skimmed milk, in short, insufficient food, suffer a lack of constitutional vigor, and while thus enfeebled, received a second shock by a railway transportation from Michigan to Chicago; and before they had either time or opportunity for recuperation, are again shipped by rail and brought to Iowa. Under such conditions it must require considerable time and special care to get them into good condition—if such be possible—to enter upon and endure the rigors of such a winter as the last has been. If added to all these conditions are conjoined the very unsanitary surroundings of this herd we can scarcely be surprised that they should suffer from such diseases as accompany a low vitality and depressing influences.

The question of contagion and infection is an important one and while this whole subject may be said even yet to be "*sub judice*," Law, in his "Report on Diseases of Domestic Animals," in the *National Health Bulletin*, July 24, 1880, (Library of State Board of Health) believes "tuberculosis" in cattle to be contagious. I am inclined to the opinion that Mr. D. will lose his whole herd of calves, and there is (if we may credit the theory of Law) danger that other cattle occupying the same pasture may contract the disease, and we may reasonably expect the weak and young to show the greatest susceptibility. At this time there seems to be a period of quietude, if you please, of the disease, but the disease is there—tuberculosis—and it will—sooner or later—and at no very distant day declare itself by recurring deaths. I would recommend that when the calves again begin to die daily—none having died for a week now—that a *competent veterinary* surgeon be sent there to further investigate the disease before the cattle are turned upon pasture. The board of supervisors not being in session, I did not think it necessary for me to visit Clinton and confer with the county auditor, but wrote him my impressions of the case and solicited correspondence.

Having no executive authority under chapter 151 of Eighteenth General Assembly, I simply ventured some suggestions in the premises. My only apology for the length of the report must be found in the importance of the subject. I have the honor to be, my dear sir,

Very truly yours,

W. S. ROBERTSON,
President State Board of Health.

REPORT OF DR. DETMERS.

HON. J. H. GEAR, *Governor of Iowa:*

SIR—Your favor of the 26th ult., in which you request me to go to Wheatland, Clinton county, Iowa, and to examine there a herd of calves or yearlings alleged to be affected with *pleuro-pneumonia*, arrived in due time, but owing to my absence from home, I did not receive it till Wednesday, the 30th ult. I immediately wrote to the Hon. President of the Iowa State Board of Health, W. S. Robertson, M. D., at Muscatine, Iowa, from whom I also found a letter on my table, in which he asked me to meet him at Wheatland at such a day as would be convenient to me. On Tuesday, March 31st, I went to Wheatland in compliance with your request, and arrived there in the evening of the same day. I expected to meet Dr. Robertson, but owing to snow-storms, inundations, and high water everywhere, no train arrived at that place from Davenport, and Dr. Robertson, after much delay, was obliged to come over *via* Fulton. He, therefore, did not reach Wheatland before Friday evening, too late to go to Mr. Davisson's place, and to proceed with the examination. We, Dr. Robertson and myself, went there early next Saturday morning, and after looking over the grounds, made a thorough examination of nearly all those calves and yearlings which exhibited any symptoms or indications of disease. But before I proceed further, allow me to make the following state-

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ments: Mr. Davisson bought in October fifty-seven calves in Chicago—said calves were bought in the "Northwestern" division of the stockyards, and represented as having come from Michigan, and as he raised nine calves himself, his herd of calves, after the purchase of the fifty-seven, consisted of sixty-six animals. Of these he lost by death in all eighteen head, most of which died in November, December and January. Dr. Robertson counted forty-three head in the yard, but 1 afterward found three calves in the barn, of which I do not know whether the same were in the lot when the herd was counted or not. Mr. Davisson's statement as to his losses may, therefore, be approximately correct. We, Dr. Robertson and myself, subjected seven calves to a special examination. They all, and several others too, coughed, were lousy and emaciated, exhibited indications of being unthrifty and not in good health, *but none of them presented any symptoms characteristic of contagious pleuro-pneumonia of cattle or bovine lung plague.*

Their temperature, ascertained by a thermometer which I know to be correct and reliable, proved to be as follows: Calf No. 1, 101.5° F.; No. 2, 102° F.; No. 3, 100.5° F.; No. 4, 103° F.; No. 5, 100.8° F.; No. 6, 100.4° F.; and No. 7, 101.5° F. Consequently only one animal—calf No. 4—presented an abnormally high temperature; viz., 103° F. Therefore, in order to remove every doubt, it was concluded to kill calf No. 4 for *post-mortem* examination. The same was killed by bleeding, and the autopsy was immediately made by myself. On opening the chest both lungs appeared to be perfectly collapsed, and of hardly more than normal size and weight. As was afterward ascertained, every portion of them, when thrown into a bucket full of water, not only floated, but also remained with more than half of its substance above the surface of the water; consequently there was nowhere any serious condensation or hepatization, such as is always found in contagious *pleuro-pneumonia.* The thoracic cavity contained a small quantity of serum, but the pleuras (costal and pulmonary), and also the pericardium, presented everywhere a smooth surface and a perfectly normal appearance. On cutting into the lungs several lobules in both lungs, but particularly such as are situated in close proximity to larger bronchi, appeared to be somewhat infiltrated with yet fluid exudation, but the latter existed only in the lobules proper, and NOT *at all in the inter-lobular connective tissue,* while *in contagious pleuro-pneumonia the inter-lobular connective tissue invariably becomes filled with plastic exudation before the lobules themselves are seriously affected.* The bronchi and bronchial tubes, or at least many of them, were opened for the purpose of ascertaining the presence or absence of worms (*Strongilus micurus*), but none could be found.

In conclusion I have to say that *the calves or yearlings in question are not and never have been affected with contagious pleuro-pneumonia or bovine lung plaque.* That so many of the calves purchased by Mr. Davisson have died, and that so many of those yet living are more or less diseased, can be accounted for to a great extent: *First*, by the calves being not acclimated when taken to Mr. Davisson's farm, and thus, at a tender age, subjected to very severe changes, not only as to food, but also as to keeping and treatment in general; *Second*, by the very bad sanitary conditions prevailing on Mr. Davisson's premises.

People who import Eastern calves, and compel the same to accommodate themselves at once to Western food, climate, and mode of keeping, must not complain if their losses are heavy.

Very respectfully submitted,

H. J. DETMERS.

CHICAGO, ILL., *March 4, 1881.*

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SUPPLEMENTAL REPORT OF DR. ROBERTSON.

STATE BOARD OF HEALTH,
OFFICE OF THE PRESIDENT,
MUSCATINE, IOWA, April 4, 1881.

HON. JNO. H. GEAR, *Governor of Iowa:*

DEAR SIR—I have the honor to report that, according to appointment, I met H. J. Detmers, V. S., of Chicago, at Wheatland, Clinton county, Iowa, on last Saturday, and we examined the herd of calves belonging to Mr. N. Davisson, which had been reported to your office as having *pleuro-pneumonia*. While Dr. Detmers will furnish your office the formal report of our investigation, I may say that it confirms my former report, that the disease "is not epidemic pleuro-pneumonia, and is not believed to be contagious." An improved sanitation since my former visit has improved the general condition of the stock, but, as already remarked, the vitality of the herd is extremely low, and the rigors of severe winter have induced in them a degree of suffering and loss which animals of greater constitutional strength would not have experienced.

Mr. D. feels the loss of the animals deeply, and I respectfully suggest that the State recompense him for the loss sustained in the animals killed for examination by myself and Dr. Detmers, which was for the protection of the herds of Iowa from so dread a calamity as epidemic *pleuro-pneumonia*.

I am, my dear sir, very truly yours,

W. S. ROBERTSON,
President State Board of Health.

At the regular meeting of the State Board, May 3, 1881, Dr. Robertson, President of the Board, presented the foregoing correspondence and reports, which were accepted, and the Secretary was instructed to have printed one thousand copies thereof, to be distributed to the secretaries of agricultural societies in the State, which was accordingly done.

Public alarm immediately subsided, and what promised to be a serious disturbance of the traffic in cattle from this State was averted by the prompt measures taken to decide the nature of the disease; for, so soon as the rumored presence of the disease became current, application was made to this office, by the British Consul resident in Chicago, for all facts attainable in relation thereto, thus showing how closely England watches her sources of food supply.

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REPORTS BY HEALTH PHYSICIANS AND CLERKS OF LOCAL BOARDS OF HEALTH.

For the year 1880, the clerks of three hundred and eighty-eight townships and twenty-nine cities and towns, and one hundred and seventeen health physicians, made a report to this office. There are one thousand five hundred and twenty-eight townships and two hundred and eighty-three incorporated cities and towns (as recorded with the Secretary of State) in the State, so that reports were received from less than one-third of the State.

The information sought from the clerks and health physicians of local boards of health, if fully rendered, would furnish the data from which to construct a complete map of the condition of every locality in the State, so that by study and comparison may be ascertained the conditions under which "diseases dangerous to the public health" prove most fatal, and the most suitable methods for their prevention.

It was not expected that perfection would be reached by this first effort. The vast majority of the people have never given the matter a thought. The subject is entirely new, and many had no knowledge or conception of what was required. Instead of using the blanks prepared by this office for their report, seventy-five clerks write a a special letter saying they have no report to make, because there has been no sickness and no contagious diseases. They do not appreciate the fact that it is equally important, in compiling a record of the State at large, to know where there has been little or no sickness as to know where there has been little or much, that the causes may be studied and made known. A few samples of these letters are hereto appended:

COLLEGE TOWNSHIP, LINN COUNTY, November 11, 1881.

Secretary State Board of Health:

The only cases of disease dangerous to the public health are two cases of scarlet fever, neither fatal.

JOHN M. WILSON,
Clerk.

CLEAR CREEK TOWNSHIP, JASPER COUNTY, November 6, 1880.

I did not receive a copy of the laws of the Eighteenth General Assembly until too late to call a meeting of the trustees on the first Monday in November, so we have no board, and I have no data from which to make a report. Will state from

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unofficial sources that we, as a rule, are enjoying the ordinary blessings of health. Diphtheria is in the township, but no fatal cases that I know of.

CASS STOCK, *Clerk.*

RUSSELL, LUCAS COUNTY, November 15, 1880.

Secretary State Board of Health:

The trustees of Washington township organized as a board of health last July and appointed a health physician, but transacted no further business. Neither of us has sufficient data with which to fill the blank reports. The subject of health would be an important one in this locality if properly reported. Within the last year there have been many cases of scarlet fever of serious type; also of diphtheria. Not being able to report on the blank, I send this.

ALFRED GOODWIN, *Clerk.*

RICHLAND TOWNSHIP, CHEROKEE COUNTY, November 15, 1880.

Secretary State Board of Health:

DEAR SIR—The local board met but did nothing, as they thought there was nothing to do. There have been no contagious diseases in the township, and there is no physician therein.

F. D. BAILEY, *Clerk.*

MURRAY, CLARKE COUNTY, November 8, 1880.

Secretary State Board of Health:

DEAR SIR—No epidemic or contagious diseases in this township. Have nothing to report.

S. L. LANDIS, M. D.,
Health Officer.

ELLINGTON, HANCOCK COUNTY, November 4, 1880.

Secretary State Board of Health:

DEAR SIR—This is a very healthy country up here. There have been but three or four deaths and no dangerous diseases in this township during the past year.

CHARLES A. CLARK, *Clerk.*

SERGEANT'S BLUFF, WOODBURY COUNTY, November 8, 1880.

Secretary State Board of Health:

DEAR SIR—I do not exactly understand what kind of report should come from me. We have had no contagious diseases in this township during the past year.

J. A. TAFT, *Clerk.*

WASHINGTON, BUENA VISTA COUNTY, November 8, 1880.

Secretary State Board of Health:

DEAR SIR—I am at a loss to know what is my duty. The trustees have taken no action, and no health physician has been appointed. The health of the township is good; no contagious diseases—in fact, no sickness of any description. I will cheerfully perform any duty when I know what is required.

THOMAS J. MCCLUNG, *Clerk.*

MIDDLEFIELD, BUCHANAN COUNTY, November 6, 1880.

Secretary State Board of Health:

DEAR SIR—Our trustees have not organized. I am not posted on the duties suggested in your circular. Diphtheria has raged in this township; know of but one death.

A. M. LANE, *Clerk.*

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LINCOLN TOWNSHIP, POWESHIEK COUNTY, November 1, 1880.

Secretary State Board of Health:

DEAR SIR—We are all ignorant as to our duty under this law. There has been nothing contagious in this township, except a few cases of diphtheria; one death. J. C. MORGAN, *Clerk.*

WASHINGTON, POLK COUNTY, November 16, 1880.

Secretary State Board of Health:

DEAR SIR—The trustees have not yet organized as a board of health. Not having received acts of the General Assembly, they did not know their duty. They supposed the law applied only to cities and towns. We will endeavor to work in harmony with the State Board. There have been several cases of diphtheria in this township, but none fatal. ASAPH A. KNOWLTON, *Clerk.*

STANTON TOWNSHIP, PLYMOUTH COUNTY, November 12, 1880.

Secretary State Board of Health:

DEAR SIR—We have had no disease of any kind in our township, therefore the board did not organize. It is a high, cool country, and exceedingly healthy.
THOMAS STOKES, *Clerk.*

WINDSOR TOWNSHIP, FAYETTE COUNTY, November 12, 1880.

Secretary State Board of Health:

DEAR SIR—The health of our township is good, with no epidemics to report. Most of the deaths have been of children, from diphtheria, four in all.
JAMES GROHORN, *Clerk.*

HIGHLAND TOWNSHIP, GUTHRIE COUNTY, November 26, 1880.

Secretary State Board of Health:

DEAR SIR—After receiving your blanks and circulars, I notified the township trustees, and requested them to take some action, but they ignored the whole matter, and said they would have nothing to do with it, that we had no physician in the township, and did not need any. We had no contagious diseases.
D. G. GARNES, *Clerk.*

MUSCATINE, August 7, 1880.

Secretary State Board of Health:

DEAR SIR—In the latter part of May a mild epidemic of scarlet fever appeared at this place. The epidemic lasted until about June 15th, and resulted in twenty (20) cases and five deaths. At the above date the epidemic ceased. However, on August 1, one case was reported, and since that time the number has been increased to eight, with one death, making in all, since June 1, twenty-eight (28) cases and six (6) deaths.

Yours, etc.,
F. H. LITTLE, *Health officer of Muscatine.*

Under date of October 4th, Dr. Little wrote:

It again becomes my duty to report another outbreak of scarlet fever, which occurred in this city about September 20th. Nine cases were reported and one death. We have had no cases of the disease since August 1st, when it suddenly

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appeared. The first case was of malignant form, the patient dying at the end of the third day of the attack. The other cases have been of the simple form of the disease, and no deaths.

We have isolated the cases as much as possible, and I am happy to say the threatened epidemic is abating.

Yours, etc.,

F. H. LITTLE, *H. O.*

WAUBEEK, LINN COUNTY, July 16, 1881.

Secretary State Board of Health:

DEAR SIR—I am informed you have adopted rules and regulations in regard to contagious diseases, and have them printed in form for posting. Will you please send a few; also copies of your circular on diphtheria. We are severely afflicted in this locality at present with a very malignant type of diphtheria which can only be checked by rigid quarantine.

Yours truly,

E. A. WARNER.

WAUBEEK, LINN COUNTY, August 14, 1880.

Secretary State Board of Health:

DEAR SIR—Our board of health is at last organized for protection, but diphtheria is raging fatally, and is spreading through the county. Please favor us with any thing you can for our benefit. Send a dozen or more of your circulars on diphtheria, and oblige yours,

D. W. KING.

WAUBEEK, LINN COUNTY, July 22, 1880.

Secretary State Board of Health:

DEAR SIR—I will give you some facts in regard to our recent epidemic of diptheria. The disease has visited us in a very severe form, out of forty cases only three or four being anything like light. Several cases, after recovery from the severity of the disease, have resulted in death from exhaustion, owing to the profoundly altered state of the blood. There has been a total of forty cases, with twelve deaths. I have had the management of them all. Some advanced rapidly to a fatal termination; others lingered three or four weeks. Some of them were of the most malignant type, bleeding from nose, eyes, ears and mouth, and at all points on the body where there was an abrasion of the skin. Three died from diptheritic croup. At first people did not heed my warning to be cautious about its spread, but finally they became almost panic stricken, and are now ready for any suggestions, with the exception of a few, who still will not believe in the great contagiousness of the dread disease. The epidemic is now declining. I only have four cases. all in one family, and recovering. One of them is suffering from paralysis of the naso-palatine muscles, and a feeble and irregular heart. We desire information and suggestions from the State Board, and will endeavor to carry them out faithfully. This is the third time in two years the disease has visited this locality, but not in so severe a form.

Respectfully yours,

WARD WOODBRIDGE. M. D.,
Health Physician.

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STATEMENT.

Showing by counties, the number of cities, incorporated towns, and townships in the State; the number of each from which reports have been received; the number of clerks and health physicians of local boards of health who have reported, and the number of cases of contagious diseases prevailing within the jurisdiction of such local board, for the yeer 1880.

COUNTIES.	CITIES.		TOWNS.		TOWNSHIPS.				CASES OF DISEASES.							
	Total number of	No. clerks that have reported.	Number of	No. clerks that have reported.	Number of	No. clerks that have reported.	Total No. clerks that have reported.	Number of health physicians.	Small-pox.	Cholera.	Diphtheria.	Scarlet fever.	Typhoid fever.	Measles.	Whooping-cough.	Cerebro spinal meningitis.
Total—State	47	8	318	21	1448	385	402	116	..	3	1474	714	356	841	487	27
Adair	..	....	2	....	17	2	2	....	..	..	....	....	....	....	....	....
Adams	..	....	2	....	12	2	2	....	..	..	....	....	....	6	....	....
Allamakee	..	....	2	....	18	5	5	....	..	..	....	....	1	1	....	....
Appanoose	1	....	2	....	17	4	4	....	..	..	3	....	1	....	2	....
Audubon	..	....	2	....	12	2	2	....	..	..	8	....	....	136	....	....
Benton	1	....	3	1	22	9	10	1	..	..	14	....	6	....	6	....
Black Hawk	2	1	1	1	18	7	9	6	..	..	18	7	13	....	....	2
Boone	1	....	3	1	17	4	5	1	..	..	1	....	....	....	....	....
Bremer	1	....	....	1	14	3	4	....	..	..	....	....	....	....	....	....
Buchanan	1	1	1	1	16	3	5	4	..	..	31	11	....	....	....	1
Buena Vista	..	....	3	....	17	1	1	....	..	..	....	....	....	....	1	....
Butler	..	....	4	....	16	6	1	2	..	..	11	1	1	....	....	....
Calhoun	..	....	2	....	15	5	5	1	..	..	2	....	5	6	19	....
Carroll	..	....	2	....	16	4	4	....	..	..	44	....	....	....	....	....
Cass	1	....	3	....	16	3	3	....	..	..	5	....	....	....	....	....
Cedar	..	....	6	....	17	5	5	10	..	..	140	34	33	25	8	3
Cerro Gordo	1	....	1	....	16	7	7	2	..	..	2	42	3	....	1	1
Cherokee	..	....	2	....	16	....	....	....	....	....	....	....	....	....	....	....
Chickasaw	..	....	3	....	12	2	2	1	..	2	6	6	3	....	25	....
Clarke	..	....	2	....	12	2	2	2	..	..	2	....	1	....	....	....
Clay	..	....	1	....	11	2	2	....	..	..	....	....	....	....	26	....
Clayton	..	....	4	....	22	11	11	6	..	1	92	1	....	7	4	....
Clinton	2	1	5	....	21	1	1	1	..	..	75	....	....	....	2	3
Cralwford	..	....	3	....	20	10	10	1	..	..	3	....	9	....	....	....
Dalas	..	....	6	....	16	4	4	....	..	..	1	....	....	24	....	....
Davis	..	....	2	2	15	5	7	2	..	..	49	18	7	62	36	....
Decatur	..	....	4	2	17	2	4	2	..	..	....	45	....	....	....	....
Delaware	1	....	1	....	16	13	13	1	..	..	31	9	1	....	....	....
Des Moines	1	1	1	....	11	2	3	2	..	..	59	43	16	....	2	....
Dickinson	..	....	1	....	12	6	6	....	..	..	15	....	2	....	2	....
Dubuque	1	....	12	....	18	3	3	1	..	..	1	3	5	....	....	1

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STATEMENT—CONTINUED.

COUNTIES.	CITIES.		TOWNS.		TOWNSHIPS.			Number of health physicians	CASES OF DISEASES.						
	Total number of.	No. clerks that have reported.	Number of.	No. clerks that have reported.	Number of.	No. clerks that have reported.	Total No. clerks that have reported.		Small-pox.	Cholera.	Diphtheria.	Scarlet fever.	Typhoid fever.	Measles.	Whooping cough.	Cerebro-spinal meningitis.
Emmet	..	....	...	....	9	3	3	...	..	..	...	...	...	...	...	....
Fayette	..	....	3	....	21	2	2	2	..	..	60	12	1	...	4	....
Floyd	1	....	3	....	12	4	4	...	..	..	...	2	...	2	...	....
Franklin	..	....	2	2	17	5	7	2	..	..	3	...	...	22	...	....
Fremont	1	....	4	1	13	5	6	2	..	..	13	...	19	22	11	....
Greene	..	....	3	....	16	3	3	...	..	..	...	25	1	39	8	....
Grundy	..	....	2	....	14	3	3	...	..	..	33	...	8	...	...	....
Guthrie	..	....	4	2	16	7	9	2	..	..	64	...	14	...	...	1
Hamilton	..	....	1	....	14	2	2	...	..	..	12	...	2	...	...	....
Hancock	..	....	...	....	14	2	2	...	..	..	11	6	...	...	...	....
Hardin	..	....	6	2	15	...	2	...	..	..	42	...	1	...	...	1
Harrison	..	....	4	2	20	9	11	2	..	..	40	18	6	2	7	....
Henry	1	....	3	....	12	6	6	3	..	..	...	...	6	40	...	....
Howard	..	....	2	....	11	2	2	1	..	..	...	...	3	...	1	1
Humboldt	..	....	3	....	12	...	...	...	..	..	...	...	...	...	...	....
Ida	..	....	2	....	11	...	...	...	..	..	...	...	...	...	...	....
Iowa	..	....	3	....	18	2	2	2	..	..	...	...	...	...	...	....
Jackson	1	....	4	....	18	3	3	3	..	..	...	1	1	10	...	....
Jasper	1	....	4	...	19	2	2	2	..	..	49	...	...	9	...	....
Jefferson	1	....	1	....	12	7	7	3	..	..	42	26	13	4	...	4
Johnson	1	....	2	....	20	4	4	...	..	..	27	...	6	...	2	....
Jones	1	....	4	....	16	1	1	1	..	..	7	...	...	...	...	....
Keokuk	..	....	6	....	16	5	5	6	..	..	94	63	19	171	68	4
Kossuth	..	....	1	....	9	3	3	1	..	..	13	...	...	...	6	....
Lee	2	1	3	1	16	....	2	...	..	..	...	...	1	33	...	1
Linn	1	....	5	....	20	4	4	4	..	..	...	...	...	...	...	....
Louisa	..	....	7	....	12	2	2	...	..	..	2	...	3	...	...	....
Lucas	1	....	...	....	13	5	5	...	..	..	4	22	1	...	...	....
Lyon	..	....	...	....	12	...	...	...	..	..	..	...	...	...	...	....
Madison	1	....	3	....	17	2	2	2	..	..	...	...	2	...	...	....
Mahaska	1	....	3	....	9	3	3	...	..	..	10	...	3	...	...	....
Marion	2	....	2	....	15	8	8	...	..	..	4	...	30	...	...	1
Marshall	1	....	4	....	18	6	6	2	..	..	2	12	...	12	41	....
Mills	..	....	4	....	14	...	...	...	..	..	...	...	...	...	...	....
Mitchell	1	....	4	....	15	7	7	1	..	..	2	32	2	...	...	....
Monona	..	....	2	....	19	8	8	2	..	..	32	6	2	18	...	....
Monroe	1	....	...	....	12	6	6	...	..	..	13	...	5	27	48	8
Montgomery	1	....	1	....	12	2	2	...	..	..	...	...	...	2	...	....
Muscatine	1	....	4	....	14	4	4	4	..	..	33	45	1	17	...	....
O'Brien	..	....	2	....	16	7	7	...	..	..	16	3	4	...	...	....
Osceola	..	....	1	....	9	5	5	...	..	..	...	...	4	...	...	1
Page	1	....	3	....	16	3	3	2	..	..	8	2	5	20	...	....
Palo Alto	..	....	1	....	14	9	9	...	..	..	...	...	5	...	5	....
Plymouth	..	....	2	....	20	5	5	...	..	..	4	...	1	...	3	...
Pocahontas	..	....	...	....	14	2	2	...	..	..	1	6	2	...	...	....
Polk	1	....	7	....	22	4	4	1	..	..	17	...	...	...	...	....
Pottawattamie	1	....	3	....	27	5	5	...	..	..	8	...	...	55	...	....
Poweshiek	1	....	4	....	15	4	4	4	..	..	12	...	...	...	...	....
Ringgold	..	....	1	1	17	3	4	...	..	..	...	...	...	...	...	2
Sac	..	....	3	....	16	3	3	...	..	..	...	...	...	...	...	....

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STATEMENT—CONTINUED.

COUNTIES.	CITIES.		TOWNS.		TOWNSHIPS.				CASES OF DISEASES.							
	Total number of.	No. clerks that have reported.	Number of.	No. clerks that have reported.	Number of.	No. clerks that have reported.	Total No. clerks that have reported.	Number of health physicians	Small-pox.	Cholera.	Diphtheria.	Scarlet fever.	Typhoid fever.	Measles.	Whooping cough.	Cerebro-spinal meningitis.
Scott	1	....	3	....	16	10	10	4	..	..	39	85	27	10	37	....
Shelby	..	....	2	1	16	7	8	2	..	..	2	11	3	8	...	....
Sioux	..	....	...	...	14	....	....	....	..	..	....	...	...	...	...	....
Story	..	....	3	....	16	8	8	3	..	..	37	11	10	21	1	....
Tama	..	....	5	....	21	6	6	3	..	..	16	49	3	14	22	....
Taylor	..	....	3	....	17	7	7	....	..	..	13	...	3	1	...	....
Union	1	....	1	....	13	1	1	....	..	..	....	...	4	...	...	....
Van Buren	..	....	5	....	14	2	2	....	..	..	....	...	12	...	...	....
Wapello	1	....	3	....	14	4	4	2	..	..	17	19	...	98	72	....
Warren	1	....	2	....	16	....	....	....	..	..	....	...	...	...	...	....
Washington	1	....	1	....	15	3	3	1	..	..	....	2	3	...	...	....
Wayne	..	....	4	....	21	2	2	....	..	..	17	...	6	...	...	....
Webster	1	....	1	....	23	5	5	1	..	..	51	14	10	12	19	2
Winnebago	..	....	2	....	5	1	1	....	..	..	....	...	...	...	...	....
Winnesheik	1	....	3	1	20	1	2	1	..	..	7	12	...	...	...	....
Woodbury	1	....	...	....	23	2	2	....	..	..	9	...	1	...	...	....
Worth	..	....	1	....	12	2	2	....	..	..	1	7	...	...	...	....
Wright	..	....	1	....	15	3	3	....	..	..	....	...	...	...	...	....

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The foregoing statement is compiled, not because of the value it contains, but for the purpose of showing those whose duty it is to furnish the reports from which the statement is compiled, the methods, and the importance of greater completeness and care. In many cases it is impossible to tabulate the reports. Instead of giving figures to designate the cases of diseases, entries would be made of "several"; "a few"; "unknown"; "some"; "none reported"; "several, but not reported to me." The very meager reports from health physicians evidences that very few local boards were organized throughout the State. It will be seen that only eight clerks of cities, twenty-one clerks of incorporated towns, and 388 clerks of townships, have reported. The only value of statistical reports rests in their completeness. It is hoped there will be a more perfect compliance with the law. The names of every city, town, and township clerk in the State are on record in this office, but it has been deemed best not to give the statement of townships, cities, and towns in this report, believing that as the local officers and the people become familiar with the law and its object, there will be a more general compliance with its provisions.

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STATEMENT

Showing the information received from the clerks and health physicians of the county of Scott for the year 1880.

CITY, TOWN OR TOWNSHIP.	Towns.	NAME OF CLERK.	POST-OFFICE.	Number of health physicians.	NAME OF HEALTH PHYSICIAN.	POST-OFFICE.	CASES OF DISEASE.						
							Small-pox.	Diptheria.	Scarlet fever.	Measles.	Whooping cough.	Typhoid fever.	Cerebro-spinal meningitis.
Allen's Grove		W. P. Reed	Dixon	1	S. R. Cook	Dixon		4	5		3		
Buffalo													
Buffalo	1												
Butler													
Blue Grass				1	B. T. Gadd	Blue Grass		2	4			2	
City of Davenport													
Cleona		E. P. Pepoon											
Davenport		John S. Ackley	Davenport						a few				
Davenport (city)		John McSteen	Davenport	1	A. W. Cantrill	Davenport		26	78		2	2	
Hickory Grove													
Le Claire		John J. Elliott	Le Claire		None	None			6				
Le Claire	1												
Liberty				1	S. R. Cook	Dixon		1	7		1		
Lincoln													
Pleasant Valley													
Princeton		J. B. Parcell	Princeton	1	John Knox	Princeton			7				
Princeton	1			1	John Knox	Princeton			27		20		
Rockingham		R. S. Whyte	Rockingham		None	None			7		4	6	
Sheridan		E. V. Van Eps	Eldridge		None	None		2					
Winfield		Chris. Marty	Long Grove		None	None					1		
	3			6				35	139		31	10	

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The foregoing statement is printed, that clerks and health physicians of local boards of health may see the object of securing these reports. If there were complete returns from each locality in the State, the information contained therein would be valuable, in connection with vital statistics gathered from other sources. Whenever accurate reports can be had of contagious diseases, the months of their prevalence throughout the year, and their causes, the compilation will be extended. It was not expected to secure these results the first year, but there is no reason why great improvement should not be made, as those public officers having duties to perform become familiar with the law, and understand the importance attached to the information which they can contribute to aid in securing methods for the prevention of contagious diseases.

Very many health physicians omit in their reports important facts. They give the number of cases of contagious diseases, but omit the months in which they prevailed, and also their sources. Some report "several" cases; some "a few"; some give the number of cases, but omit to state the kind of disease.

If the reports received from clerks and health physicians is an indication, there are but comparatively few organized local boards of health. In fact a large proportion of the township clerks report that the trustees have neglected entirely to take any action under the law. There are fourteen hundred and forty-eight townships in the State; only four hundred and two clerks have made any report, of whom more than one-half state that there is no organized board of health in the township. Inasmuch as there exists, by virtue of law, a board of health in every city, town and township within the State, the dereliction of duty, is as unfortunate as reprehensible. In several counties exist active and model boards of health, and the result of their labor is seen in the large decrease of mortality rate, and exemption from epidemic diseases. One of these boards reports they have reduced the mortality nearly one half, and that it is two thirds less than the three surrounding townships where no organized board exists; beside they have been able to control and restrict contagious diseases, of one of which (diphtheria), they were menaced in a marked degree. A vast amount of useful knowledge might be obtained for the information of all, if local officers would collate and send to this office, the result of their experience. It is firmly believed that so soon as a more thorough organization exists throughout the State, abundant material

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will be furnished, from which to compile statements beneficial to the public, and tend to greater zeal in sanitary matters.

PREVALENCE OF DIPHTHERIA BY MONTHS.

From the returns made by the officers of local boards, the following table of prevalence of diphtheria by months of the year is compiled:

January	54	July	36
February	29	August	107
March	22	September	129
April	31	October	352
May	24	November	86
June	19	December	30

The clerk of Sharon township, Clayton county, reports fifty-three cases of diphtheria in that township, the first appearing May 28, the last October 26.

While the following returns embrace but a very few of the towns and townships of the State, and are not even an approximate representation of the actual facts they show so far as they go, that diphtheria is a cold weather disease. The statement is here given not so much to settle a question of time as to show the officers of local boards, whose duty it is to report these facts, the importance of full and complete returns.

SMALL-POX.

Sporadic cases of small-pox were reported to this office during the winter and spring of 1880–1, from Creston, Union county, Prescott, Adams county, and Lenox, Taylor county. In all these cases the source was traced to Burlington. Cases were also reported from Calliope, Sioux county, where the disease assumed nearly an epidemic. The source was traced to Dakota. From these cases the disease was carried to Jefferson, Greene county; thence to Dayton, in Boone county. Cases were also reported from Carlisle, brought there by a family who came from Illinois. From the same source, a case was developed in Des Moines. In all the foregoing, prompt isolation and vigorous quarantine measures confined the disease, except in Calliope, to the original case. The local papers at Burlington reported several deaths from this disease, but no authoritative report of the same has been received at this office.

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The practical experience in these cases has demonstrated beyond dispute or doubt that, with a well-organized board of health in any locality, this dreaded disease may be entirely controlled and rendered comparatively harmless.

During the year, there was repeated inquiry as to the powers of local boards relative to small-pox, and whether or not such boards had power to require general vaccination of the people within their jurisdiction. The matter was referred to the Attorney-general, who returned the following opinion:

Section 22, chapter 151, laws 1880, provides for the removal of person infected with small-pox; also for other persons in the neighborhood, and declares that the local board "*may take such other measures as may be deemed necessary for the safety of the inhabitants.*" I have no question at all, but that local boards of health have the power to regulate and determine how vaccination shall be done; and that the board may direct all persons shall be vaccinated.

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ABSTRACT OF PROCEEDINGS OF THE MAY MEETING, 1881.

The Board met at the office of the secretary, May 3, 1881. There were present all members of the Board, except Dr. Roberts.

The President submitted a series of resolutions adopted by the Scott County Medical Society, indorsing the object and purpose of the State Board of Health, together with his reply thereto, which were accepted and placed on file.

The President presented a series of suggestions relative to necessary legislation to secure a more satisfactory operation of the health law, which were referred to the Attorney-general.

Mr. Loring, civil engineer, presented a question of drainage, and the right of carrying water by drains across the lands of another, and the necessity for legislation thereon, which was referred to the Attorney-general, with instructions to take such action as was deemed necessary.

The President presented a paper on "Adulteration of Food," prepared by Dr. R. J. Farquharson, which was read, accepted and ordered printed in the biennial report of the Board.

Dr. Lewellen, of the Committee on Forms, reported a circular on "Treatment of the Drowned," recommending its adoption and that two thousand copies be printed for distribution. The report was adopted.

Dr. Hull, of the Standing Committee on Ventilation, submitted a paper which was read and ordered printed in the biennial report of the Board, but at the special request of the author was referred back to the committee.

Drs. Dickinson, Clark, Lewellen, and Reynolds, of the standing committees, reported progress, and were granted further time to complete their reports, and when made they were ordered printed in the biennial report of the Board.

Dr. Clark, of the Committee on Order of Business, submitted the following report, which was adopted:

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1. Calling the roll.
2. Reading minutes of last meeting.
3. Unfinished business.
4. Communications read and referred.
5. Bills presented and acted upon.
6. Reports of standing committees; to-wit,

   Food, Drinks, and Water supply—Dr. Dickinson.
   Ventilation—Dr. Hull.
   Education—Dr. Roberts.
   Sewerage—J. L. Loring.
   Epidemic, Endemic and Contagious Diseases—Dr. Clark.
   Slaughter-houses—Dr. Lewellen.
   Legislation—Dr. Robertson.
   Library—Drs. Lewellen, Dickinson, and Hull.
   Forms—Drs. Lewellen, Dickinson, and Secretary.

7. Reports of special committees.
8. New business.
9. General business.
10. Election of officers.

On motion, the nomenclature of the National Board of Health and Royal College of Physicians, was adopted as that of this Board, and it was ordered that all returns required to be made by physicians to the clerk of the courts and health physicians of local boards to the State Board, under the provisions of chapter 151, laws of 1880, shall conform to said nomenclature.

Dr. Reynolds was assigned to prepare a consolidated report on scarlet fever in southern Iowa.

Dr. Dickinson was appointed a committee, with the Secretary, to select rooms in the new capitol for the use of the State Board.

The following officers were elected:

President—Dr. W. S. Robertson.

Secretary—Dr. R. J. Farquharson.

A vote of thanks was unanimously tendered L. F. Andrews for his efficient services during the year, and it was ordered that he be retained for six months, to assist the Secretary elect.

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TREATMENT OF THE DROWNED.

Pursuant to instructions of the Board, the following circular on treatment of the drowned was printed in pamphlet form, and also on stiff paper in placard form, for posting up in public places.

[CIRCULAR 24A.]

TREATMENT OF THE DROWNED—TWO THINGS TO BE DONE: RESTORE BREATHING; RESTORE ANIMAL HEAT.

Fig 1.

RULE 1. **Remove all obstruction to breathing.** INSTANTLY loosen or cut apart all neck and waist bands; turn the patient on his face, with the head down hill; stand astride the hips with your face toward his head, and, locking your fingers together under his belly, raise the body as high as you can without lifting the forehead off the ground (Fig. 1), and give the body a smart jerk to remove mucus from the throat and water from the windpipe; hold the body suspended long enough to slowly count ONE, TWO, THREE, FOUR, FIVE, repeating the jerk more gently two or three times.

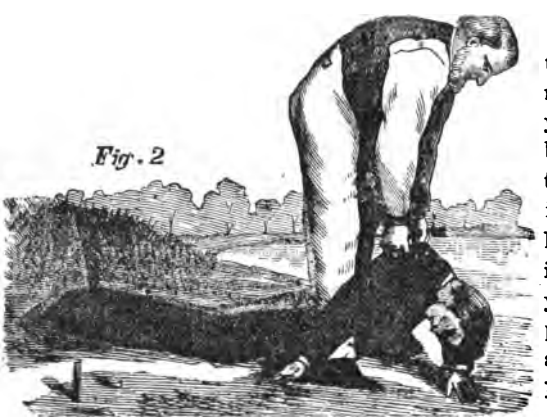
Fig. 2

RULE 2. Place the patient face downward, and maintaining all the while your position astride the body, grasp the points of the shoulders by the clothing, or, if the body is naked, thrust your fingers into the armpits, clasping your thumbs over the points of the shoulders, and **raise the chest as high as you can** (Fig.

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2) without lifting the head quite off the ground, and hold it long enough to *slowly* count ONE, TWO, THREE. Replace him on the ground, with his forehead on his flexed arm, the neck straightened out, and the mouth and nose free. Place your elbows against your knees and your hands upon the sides of his chest (Fig. 3), **over the lower ribs, and press downward and inward with increasing force** long enough to slowly count ONE, TWO. Then suddenly let go, grasp the shoulders as before and raise the chest (Fig. 2); then press upon the ribs, etc. (Fig. 3). These alternate movements should be repeated ten to fifteen times a minute for an hour at least, unless breathing is restored sooner. Use the same regularity as in natural breathing.

Fig. 3.

RULE 3. After breathing is commenced, RESTORE THE ANIMAL HEAT. Wrap him in warm blankets, apply bottles of hot water, hot bricks, or anything to restore heat. *Warm the head nearly as fast as the body, lest convulsions come on.* Rubbing the body with warm cloths or the hand, and slapping the fleshy parts, may assist to restore warmth, and the breathing also. If the patient can SURELY swallow, give hot coffee, tea, milk, or a little hot sling. Give spirits sparingly, lest they produce depression. Place the patient in a warm bed, and give him plenty of fresh air; keep him quiet.

BEWARE!

AVOID DELAY. A MOMENT may turn the scale for life or death. Dry ground, shelter, warmth, stimulants, etc., at this moment are nothing—ARTIFICIAL BREATHING IS EVERYTHING—is the ONE REMEDY—all others are secondary.

Do not stop to remove wet clothing before efforts are made to restore breathing. Precious time is wasted, and the patient may be fatally chilled by the exposure of the naked body, even in the summer. Give all your attention and effort to restore breathing by forcing air into and out of the lungs. If the breathing has just ceased, a smart slap on the face, or a vigorous twist of the hair, will sometimes start it again, and may be tried incidentally, as may, also, pressing the finger on the root of the tongue.

Before natural breathing is fully restored, do not let the patient lie on his back, unless some person holds the tongue forward. The tongue by falling back may close the windpipe and cause fatal choking.

If several persons are present one may hold the head steady, keeping the neck nearly straight; others may remove wet clothing, replacing at once clothing which is dry and warm; they may also chafe the limbs, and thus promote the circulation.

Prevent friends from crowding around the patient and excluding fresh air; also from trying to give stimulants before the patient can swallow. The first causes suffocation; the second, fatal choking.

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DO NOT GIVE UP TOO SOON: You are working for life. Any time within two hours you may be on the very threshold of success without there being any sign of it.

In suffocation by smoke or any poisonous gas, as also by hanging—proceed the same as for drowning, omitting effort to expel water, etc., from the windpipe.

In suspended breathing from effects of chloroform, hydrate of chloral, etc., proceed by Rule 2, taking especial pains to **keep the head very low,** and preventing closure of the windpipe by the tongue falling back.

The foregoing method originally published by the State Board of Health of Michigan, being a modification of that adopted by the Life-Saving Society of New York, has the sanction of other State and city boards of health, and is fully indorsed by the State Board of Health of Connecticut, Wisconsin and Iowa, and printed for general distribution as a life-saving measure.

Address STATE BOARD OF HEALTH,
Des Moines, Iowa.

PRESERVE THIS.

Study it thoughtfully, in order to act efficiently, if occasion requires.

Thanks are due Dr. Henry B. Baker, Secretary of the Michigan State Board of Health, for the use of the cuts necssary to illustrate the foregoing circular, and for the privilege of making stereotype copies of the same for the future use of this office.

By direction of the State Board of Health the Circular to Health Physicians was received and reprinted, to-wit:

[FORM 8B.]

CIRCULAR TO HEALTH PHYSICIANS.

OFFICE OF THE SECRETARY
OF THE IOWA STATE BOARD OF HEALTH,
DES MOINES, June 10, 1881.

To the Health Physician:

SIR—I herewith send you a blank form (1C) for your use in making your annual report to this Board, required by law,* *for the year ending October 31.*

PLEASE FILL OUT AND RETURN THIS REPORT AS SOON AS POSSIBLE AFTER OCTOBER 31ST.

This blank form is for diseases like one sent to the clerk of your board, but your report should be made according to your best knowledge, leaving his report to be

*Chapter 151, laws of 1880, section 15. It shall be the duty of the health physician, and also the clerk of the local board of health of every incorporated town, and also the clerk of the local board of health in each city or incorporated town or village, in the State, at least once a year, to report to the State Board of Health their proceedings, and such other facts required, on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of health.

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made by him according to his best knowledge. If each of you will report the cases reported to himself, we will then know the total number of cases reported, and to which class of officers the greatest number of reports are made; and if we have estimates of the probable number of cases not reported, made by two different persons in each locality, we may gain a good idea of the actual condition of the public health and of the public health service in the different parts of the State. General truths concerning the entire State cannot well be reached by compilation of reports when only the best or poorest townships of many counties are represented; it is therefore important that every health officer shall make a report. For a similar reason, *every blank should be filled.* If no sickness has occurred within your jurisdiction, or if there has been *no case* of any disease concerning which a report is asked, it is important to state that fact, and the reason, if known, for such healthfulness, and also the population, etc., in the blank spaces provided for those statements im the report. IT IS ALSO IMPORTANT TO FILL THE BLANKS FOR THE PROBABLE NUMBER OF CASES OF DISEASES NOT REPORTED TO YOU. As these reports are to be compiled and published, it is necessary to have uniform blank forms, because it is impossible to compile from letters and postal cards, on account of the time required to search through them; and for this reason every fact to which the report relates should be entered in its proper place *in the report*, on the blank, and not sent on scraps of paper, by letter, or on postal cards.

Your report should be made out *for the exact territory over which your board has jurisdiction*, and for which you are the health officer, and it *should not include* anything outside of such jurisdiction. A township board of health *does not have jurisdiction in an incorporated town or city*, even though such city or town be situated within the limits of the township; neither has a city board of health jurisdiction in territory outlying the city. If you have been appointed health officer for a township and an incorporated city or town, it is necessary that you make separate reports for each, just as separate as if they were made by different persons.

Please ascertain and report, as completely as possible, the causes of all fires within your jurisdiction during the year; also the number of lives lost, and of persons injured in consequence thereof.

Your attention is respectfully asked to chapter No. 151, laws of 1880, relative to duties of health officers of cities and towns. It is recommended that your board of health have copies of the law, and rules and regulations of the State Board, thoroughly distributed within your jurisdiction, in order to call attention to the subject and secure material for a complete record in your office relating to diseases which endanger the public health. You should have a record-book in which to record cases of dangerous diseases, like that of the clerk. See Circular 14B.

It is not expected that it will always be possible to fill every column of your record; but so much as it is possible to learn concerning each case should be recorded and reported, because the single fact of the number of cases of sickness from each such disease will be of value in connection with the records of death and other knowledge collected at this office. It is hoped that you will not fail to record all cases of such diseases under your own care.

In case any disease should appear in your locality as an epidemic, please make a special report of the fact to this office as soon as possible. It is also expected that

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you will study and record the conditions coincident with the rise, progress, and decline of any such epidemic, and in due time report the same to this Board. Concerning every such occurrence you should be able to report some facts which will be of use in advancing the cause of public health.

Your local board has two kinds of functions: 1. To utilize for your own community the sanitary knowledge already accessible, by restricting communicable diseases, as directed in Circulars 17B, 18B, and 21B; by recording all cases of diseases which endanger public health, that their conditions may be studied, and prevention learned; by inaugurating measures for preventing sickness and death from ordinary diseases in your community; in improving your sanitary and hygienic condition. 2. By giving to the State Board the result of your experience and research, thus adding to the general fund of knowledge, which will be compiled and returned to local boards in the reports of the State Board.

Repeated inquiries are made at this office whether or not health physicians are expected to treat cases of epidemic or contagious diseases which come under the restrictive powers of a local board, or to treat sick paupers of a township. Such is not the intent of the law. That is a matter entirely within the control and discretion of the sick or their friends, except as to paupers, for which provision is made under section 1361 of the Code of 1873.

By direction of the State Board of Health.

Very respectfully,

R. J. FARQUHARSON, *Secretary.*

Please preserve all circulars which you reveive from this office.

Direct all correspondence with this office to "State Board of Health, Des Moines, Iowa."

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DISEASES IN IOWA—SPECIAL CORRESPONDENCE.

In order to secure a more accurate knowledge of diseases in Iowa, and incidents which may be supposed to influence the rate of sickness or death, it was decided by the State Board to secure a corps of special correspondents, located in different parts of the State, which, irrespective of any official relation such correspondents may hold to local boards of health, will embrace men who are in full sympathy with the objects for which this Board is laboring; to-wit, the extension of sanitary knowledge among the people, and the education of the people in the nature and cause of preventible diseases—men who by direct acceptance of this office become identified with the Board—to whom it can appeal for any desired information, and from whom may be expected such special interest in its work as will prompt to the free communication of any facts they may deem worthy of its notice.

A circular of invitation was sent to physicians in various parts of the State, to become special correspondents. The promptness and cordiality of their acceptance is a pleasing indication that the members of the profession are in hearty accord with the object and purpose of the State Board of Health.

To these correspondents the following circular was sent:

[CIRCULAR 23B.]

TO SPECIAL CORRESPONDENTS, RELATIVE TO DISEASES IN IOWA IN 1880.

OFFICE OF
THE STATE BOARD OF HEALTH,
DES MOINES, March 20, 1881.

To the Correspondents of the State Board of Health:

GENTLEMEN—This Board desires to have, and to place upon record for purposes of future study in connection with records of deaths and of meteorological conditions, statements, for as many different localities in the State as possible, of the diseases in Iowa during the year 1880. Will you have the kindness to send, as soon as is convenient, your replies to the following questions? Please use the stamped envelope enclosed herewith, and leave all additional postage to be paid at

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this office. In replying, it will not be necessary to repeat the questions, but simply to refer to the circular by number and to each question by number.

1. If you live in a city or incorporated town, what do you estimate the number of inhabitants of said city or town at the middle of the year 1880?

2. Among these inhabitants above mentioned, what do you estimate the number of deaths from all causes during the year 1880?

3. Please state the territory for which your replies to the following questions are made?

4. Among the people of your locality, considering the increase or decrease of population, was the amount of *sickness* from all causes during the year ending December 31, 1880 *greater*, *less*, or about *the same as the average* during previous years? If not the same, how much was it increased or diminished?

5. Compared with previous years, and from all causes, was the ratio of *deaths* to inhabitants during the year 1880, *greater*, *less*, or about *the same as the average?* If not the same, how much was it increased or diminished?

6. What disease, or causes of death, were *more* than usually prevalent during the year 1880?

7. If you can assign any *cause for* the *unusual prevalence* of any disease, please do so.

8. What diseases, or causes of death were *less* than usually prevalent?

9. To what do you attribute the lessened prevalence?

10. From what diseases or causes was there *more* than the usual mortality during the year 1880?

11. If you can assign any *cause for* the *unusual mortality* from any disease, please do so.

12. From what diseases or causes was there *less* than the usual mortality?

13. To what do you attribute the lessened mortality?

14. Please mention dates of the occurrence in 1880 of all diseases attended with an *unusually high or low rate of mortality*, and state whether the rate was high or low.

15. Please mention dates of the occurrence in 1880 of all *diseases not usually occurring in your locality.*

16. State number of cases of each of these diseases; viz., small-pox, cholera, scarlet fever, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis, diphtheria, and any other epidemic, endemic, contagious, or infectious disease that appeared during 1880. (Facts are especially desired, but opinions are better than no statements, though it will be well to state them as opinions.)

17. Of the eight diseases mentioned above, *name those of which no case appeared* during the year 1880.

18. For each of months in 1880, please give a summary statement of the diseases which occurred, naming them in the order of their prevalence—greatest first.

19. During the year 1880, *what diseases* occurred, *at what time*, and *to what extent, among animals?*

20. Please give a summary statement of the meteorological conditions during

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the year 1880, specifying, if possible, the general characters for each month, and noting any peculiar or unusual condition.

21. Please state the facts concerning the *soil moisture* in your locality, during each of the months in the year 1880, *without reference to previous years*, but comparing the months in 1880 with each other. Group them in order—driest first.

22. *Compared with previous years*, in what months of the year 1881 was the *soil* in your locality *unusually dry ?*

23. *Compared with previous years*, in what months of the year 1881 was the *soil* in your locality *unusually moist ?*

24. In your locality, what is the *usual average depth of earth above the ground water*, as indicated by distance down to water in wells, streams, etc.? If different parts of your locality vary greatly, please answer for such different parts.

25. Without reference to previous years, please state the facts concerning the *depth of earth above the ground water*, nearest the surface, in your locality, during each month of the year 1881, as indicated by distance down to water in wells, streams, etc., or by other facts. How many feet and inches do you estimate it, in each month?

26. Compared with previous years, in what months of the year 1880 was the *ground water* in your locality *unusually high ?*

27. Compared with previous years, in what months of the year 1880 was the *ground water* in your locality *unusually low ?*

28. Please communicate facts bearing upon, or cases illustrating the causation or communicability of diseases.

Any suggestions which you may feel inclined to make concerning methods which seem practicable for the prevention of sickness or deaths, in your locality, or in this State, need not be withheld, but are earnestly solicited.

As stated after question 16, in the absence of positive knowledge, opinions are desired. The fact that it will be difficult, and sometimes impossible, to give the information asked for, is well understood; the importance of the subject, however, warrants the effort, which it is believed will not always be barren of results, but will tend to accumulate data which eventually will be of great value to the people.

By direction of the State Board of Health,

Very truly,

L. F. ANDREWS, *Secretary.*

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It was not expected that complete and accurate statements could be secured upon which to make a compilation of results. The correspondents were necessarily without data or information—in fact had no knowledge of what would be required in advance. Their replies are, therefore, based on memory. But a beginning has been made, and it is believed that correspondents will prepare themselves by observation and memoranda made when the facts occur, so that more comprehensive and valuable information will be obtained, the value of which depends entirely upon the accuracy of the statements and the number of localities. Effort will be made to increase the number and area of correspondents, so that every section of the State may be represented.

For convenience of reference, and comparison, the replies from correspondents have been grouped in geographical divisions (see map).

It should be borne in mind that the correspondents are alone responsible for their statements. They have been selected with care, and embrace many physicians who hold high rank in the profession.

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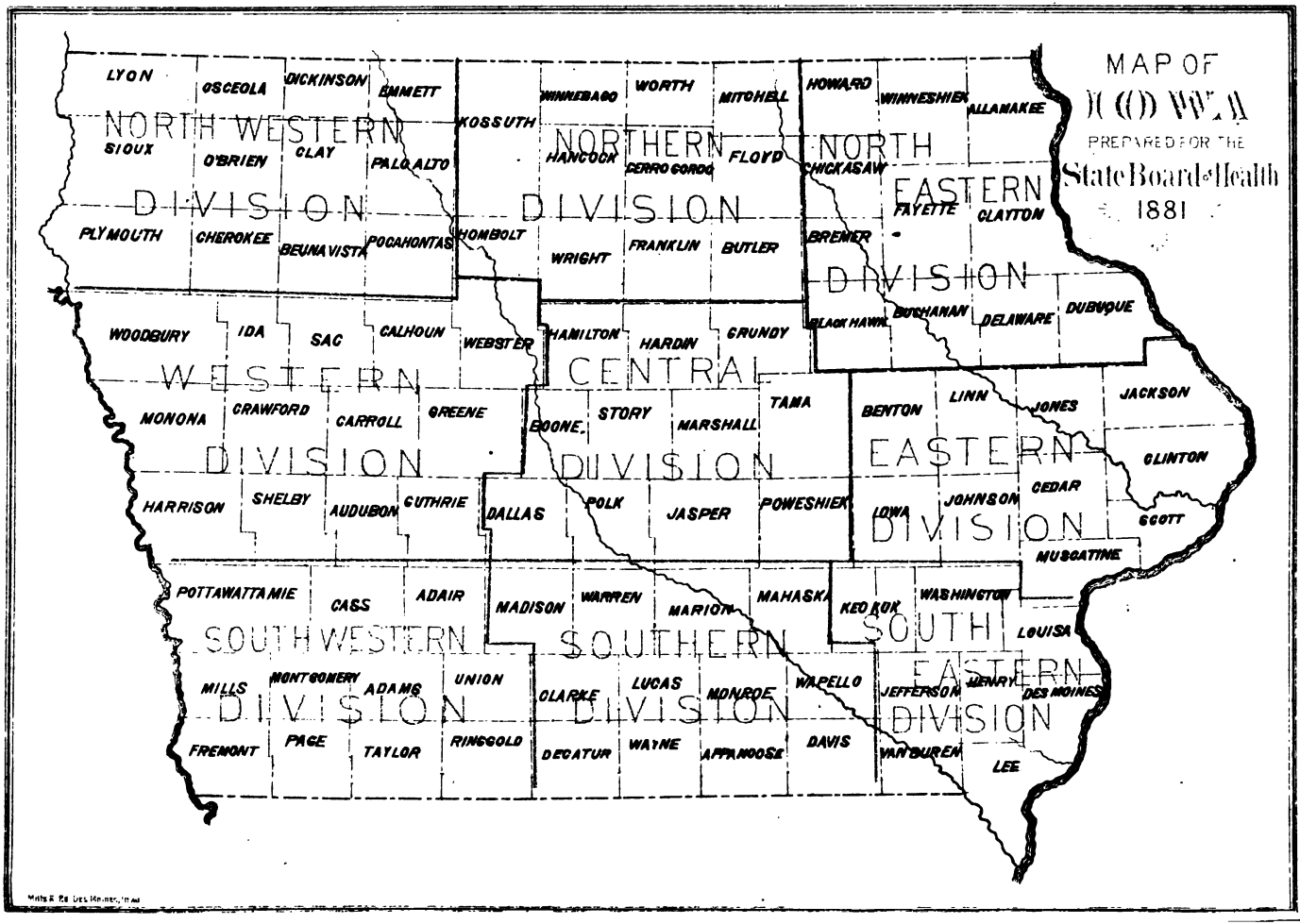

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GEOGRAPHICAL DIVISIONS OF THE STATE.

Giving a list of the counties in each division; and formed for facilitating the study of causes of sickness and death.

North-eastern Division.	Eastern Division.	South-eastern Division.	Northern Division.	Central Division.	Southern Division.	North-western Division.	Western Division.	South-western Division.
Allamakee	Benton	Des Moines	Butler	Boone	Appanoose	Buena Vista	Audubon	Adams
Black Hawk	Cedar	Henry	Cerro Gordo	Dallas	Clarke	Cherokee	Calhoun	Adair
Buchanan	Clinton	Jefferson	Floyd	Grundy	Davis	Clay	Carroll	Cass
Chickasaw	Iowa	Keokuk	Franklin	Hamilton	Decatur	Dickinson	Crawford	Fremont
Clayton	Jackson	Lee	Hancock	Hardin	Lucas	Emmet	Greene	Mills
Delaware	Johnson	Louisa	Humboldt	Jasper	Madison	Lyon	Guthrie	Montgomery
Dubuque	Jones	Van Buren	Kossuth	Marshall	Mahaska	O'Brien	Harrison	Page
Fayette	Linn	Washington	Mitchell	Poweshiek	Marion	Osceola	Ida	Pottawattamie
Howard	Muscatine		Winnebago	Polk	Monroe	Palo Alto	Monona	Ringgold
Winneshiek	Scott		Worth	Story	Wapello	Plymouth	Sac	Taylor
			Wright	Tama	Warren	Pocahontas	Shelby	Union
						Sioux	Webster	
							Woodbury	
Pop. 237,676	Pop. 271,735	Pop. 188,094	Pop. 97,945	Pop. 230,723	Pop. 216,725	Pop. 67,090	Pop. 147,898	Pop. 189,916

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NORTHEASTERN DIVISION.*

REPLIES BY FREDERICK BECKER, M. D., OF CLERMONT, FAYETTE COUNTY.

†1. According to the United States census of 1880, six hundred and fifty-six inhabitants.

2. Six, of which number two were accidental.

3. For the incorporated town of Clermont, except where otherwise noted.

4. Less, from two to three per cent.

5. About the same from all causes, but less from disease by from two to three per cent.

6. Pneumonia and influenza.

7. A greater dryness of the atmosphere.

8. All general diseases, except as noted in answer six.

9. During the greater part of the year a lessened rain-fall.

The following answers will include the whole of Clermont township:

10. From pneumonia in the aged.

11. A greater dryness of the atmosphere caused an increase in pneumonia in the aged.

12. From diphtheria.

13. To a greater dryness of atmosphere.

14. January and February, pneumonia, increased mortality; July and August, gastro-enteritis and entero-colitis, with increased mortality; April and May, measles, with no mortality.

15. Measles in April and May; typhoid fever in July.

16. Scarlet fever, 2; typhoid fever, 2; measles, 30; cholera morbus, gastro entritis and entero colitis over 100 cases; influenza 75 to 80 cases. Of these diseases there may have been more, a good many do not come under the observation of a physician.

17. Small-pox, cholera asiatica, whooping-cough, cerebro-spinal meningitis, diphtheria.

18. *January*—Broncho pneumonia, catarrhal pneumonia, and with typhoid erudition, catarrhal croup and typhlitis.

February—Pneumonia and bronchitis in adults; and children, sore throats, colds.

March—Catarrhal bronchitis and pneumonia in adults; and children, gastric catarrh.

April—Pneumonia, bronchitis, rheumatism, uterine hemorrhage, erysipelas, gastritis, scarlet fever, measles, intermittent fever.

May—Measles, erysipelas, intermittent fever, rheumatism, bronchitis.

June—Diorrhœa, otitis interna, intermittent fever, dysentery, rheumatism, bronchitis.

July—Diarrhœa, dysentery, gastro-enteritis, congestion of brain, intermittent fever.

August—Gastro-enteritis, dysentery, diorrhœa, intermittent fever, congestion of brain.

September—Intermittent fever, diarrhœa, laryngitis, pneumonia.

October—Intermittent fever, cistitis, dysentery, gastro-enteritis, diarrhœa, pneumonia, laryngitis, rheumatism.

November—Pnuemonia, cistis, pleurisy, laryngitis.

December—Laryngitis, influenza, pneumonia, pleurisy.

19. Cholera among swine and chickens during the months of October, November, and December, and epizootic among horses during November and December.

20. As near as I remember, January, February and March were dry, with frequent and rapid changes between cold and warm, March being unusually dry and warm; April cold and more rain-fall; June the moistest month in the season, having the heaviest rain-falls of any month in years, and the highest water, especially the latter part of the month; July continued in heavy rain-fall during the first half, the latter half being dry and hot; August, very hot and dry, both day and night, the thermometer ranging from 90° to 100° in the shade; September continued hot during the day from 85° to 95°, with cooler nights; October hot from 80 to 90° fore part, and dry; November cold and dry from freezing to 10° below zero

*For counties comprising this division see page 79 and map.

†The figures beginning each paragraph refer to the questions in Circular 23B, on pages 75–77.

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nights; December colder from freezing to 30° below zero both day and nights, with light snow-falls during the winter.

21. Dry months were, September, August. November, December, October. January, March, February, May, and latter part of July as regards rainfall; moist months were, June, April, and fore part of July.

22. September, November and December.

23. In June and July.

24. From 25 to 85 feet.

26. In June and July.

27. In November and December.

In regard to question number 25 I have no positive knowledge, any more than the general, given in answering the foregoing questions numbers 21 to 27.

The answers given to question number 18 are taken from my case record, and are, as far as my practice, as wellas my general knowledge reaches, nearly correct.

In regard to the prevention of disease I would say that it is my view, that disease and death are especially induced by the use of tobacco, whisky, mastubation and filth. Tobacco and whisky induce especially insanity, paralysis, dysentery in infants; sunstroke, chronic ophthalmia, chronic diphtheria, etc.

Masturbation and tobacco are the causes of two deaths of every three from consumption.

Filth is the cause of a majority of deaths from typhoid fever and diphtheria.

Tobacco and whisky used by a father or a mother, will induce deformity, paralysis, insanity and diarrhœa and dysentery in infants and children, and will most certainly increase the death rate in that class of diseases.

I would upon the ground of these experiences respectfully suggest the education of the young to abstain from these vices and injurious habits by suitable works being introduced in our public schools, and for home reading in families.

I am, gentlemen, your most obedient servant.

FREDRICK BECKER, M. D.

Clermont, Fayette County.

REPLIES FROM JOHN SHEPHERD, POSTVILLE, ALLAMAKEE COUNTY.

1. Incorporated city, 732.

2. Six; 2 from organic diseases of the heart; 2 from cholera infantum; 1 membranous croup, and one said to be broncho-pneumonia.

3. Part of counties of Allamakee, Clayton, Fayette and Winneshiek, including a circle of five miles round Postville.

4. I think rather under the average; at any rate not above.

5. Compared with the fall and winter of 1877, when we had a very fatal epidemic of diphtheria. The death rate has been light, and in 1880 rather under the average.

6. Cholera infantum, typhoid fever, scarlet fever, scarlatina and not more than usual. and the first not so fatal as in some previous years. The fatality of the second confined to one family who lost three. No deaths from the other two.

7. I cannot.

8. Cholera infantum.

9. I cannot say unless it was that the temperature was not so continuously high and dry as in some previous years. "That is only my opinion."

10. There was no unusual mortality in 1880.

12. Cholera infantum.

13. Answer to question 9 embodies all I can say.

14. The greatest number of deaths from any type of disease occurred in August and September; 2 children from cholera infantum, and in November and December 3 persons from typhhoid fever. Rate low in both cases.

15. None.

16. In town 7 cases of typhoid fever. In the country about 12; cerebro-spinal meningitis, 1; congestion of brain, 1; some sporadic cases of mild diphtheria, simple scarlatina, whooping cough, intermittent fever, pneumonia and bronchitis. The number of the last six I cannot give.

17. Small-pox, cholera and measles.

18. *January*—Scarlatina and pneumonitis.

February— Bronchitis, scarlatina and pneumonitis.

*The figures beginning each paragraph refer to questions in Circular 23B, on pages 75–77.

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March—Bronchitis, pneumonitis, scarlatina and diphtheria.
April—Intermittent fever, pneumonitis, and cerebro-spinal meningitis.
May and *June*—No diseas except a few slight cases of diarrhœa.
July—Cholera infantum and typhoid fever.
August—Cholera infantum, diarrhœa of adults and typhoid fever.
September—Cholera infantum and typhoid fever.
October—Pneumonia, bronchitis, typhoid fever, and rheumatism.
November—Intermittent fever, bronchitis, typhoid fever, croup, and pneumonia.
December—Intermittent fever, bronchitis, and typhoid fever.

19. What is called hog cholera prevailed more or less all the year, but to a great extent in spring and fall.

20. I cannot specify each month. The driest was September and October. The early part from January up to second week of July was unusually wet.

21. Answer to 20 is all I can say.

22. It was not unusually dry at any time during the year.

23. From January to second week of July.

24. Wells in town average from 12 to 25 feet. On some high farms from 25 to 50 feet.

25. I cannot say. They could not have been low from the frequent rains we had.

26. Answer to 23 is all I can say.

27. It was lowest for 1880 in September and October, but not unusually so when compared with former years.

28. I believe the cause of some diseases is to be found in a neglect of careful sanitary measures, such as filthy alleys, back yards, and privies, many of which are badly kept, and often located in too close proximity to wells. Many wells are very imperfectly protected from surface water and filth. From such negligent sanitary conditions, the medical attendant on the family where the three fatal cases of typhoid fever occurred attributes the malignant character of the disease.

The cause of the six deaths in town is given in answer No. 2. The country deaths resulted from typhoid fever, 3; active congestion of the brain, 1; paralysis agitans, 1 (duration over two years, ending in consumption); senile decay, 2; accidental, 1; organic heart disease, 1; in all, 9, with six in No. 2, total 15. Deducting the three from organic disease of the heart, one from paralysis agitans, two, senile decay, and one killed by accident, in all seven, the death rate from lymphatic and other acute diseases was light, considering that the district embraced is very thickly peopled. The number of deaths given from all causes is as near correct as known to me, and as far as I can find out.

Please pardon me for sending so imperfect a statement regarding so important a matter.

Yours very respectfully,

JOHN SHEPHERD, M. D.

Postville, Allamakee Co., April 15, 1881.

REPLIES OF J. B. DARLING, M. D., OF LAPORTE CITY, BLACK HAWK CO.

*1. Laporte City is an incorporated town of about 1,006.
2. Deaths in 1880, 10.
3. Laporte City.
4. Considering the increase, ratio some less.
5. Some less.
6. None.
7. .....
8. Diptheria and scarlatina heretofore, but in 1880 none.
9. To the sanitary condition of the place.
10. .....
11. .....
12. .....
13. No prevailing sickness.
14. .....
15. None.
16. Small-pox, cholera, scarlet fever, typhoid fever, measles, whooping cough, and all others, none.
17. None.
18. .....
19. Nothing unusual.
20. .....
21. A pleasant year all through.
22. At no time.

*The numbers at the beginning of paragraphs refers to questions in Circular 23B, pages 75–77.

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23. If anything, in June.
24. About 16 feet.
25. .....
26. Probably in June.
27. Probably in September.
28. .....

Deaths in 1880: Bright's Disease, 2; pneumonitis, 1; diarrhœa, 1; heart disease, 1; drowned, 2; apoplexy, 1; old age, 1; capillary bronchitis, 1; total, 10.

J. B. DARLING, M. D.

Laporte City, Black Hawk Co., March 30, 1880.

REPLIES OF A. MIDDLEDITCH, M. D., OF WATERLOO, BLACK HAWK CO.

*1. About 6,000.

2. Cannot answer sufficiently exact for any practical purposes.

4. About the same as during a few of the previous years; excepting there were, in 1880, more cases of diptheria than ever before, but 1879.

5. About the same on the average, but the ratio of deaths from diptheria was less than in 1879.

6. Diptheria.

7. We depend upon wells for our water supply. Our privy system is the old nuisance—privy vaults. Hence, the ground must essentially become more and more saturated year by year with filth; and the filth must year by year, more and more find its way to our wells. Is not this a sufficient cause, and will not the cause continue in force as long as victims may be found?

8. None to my knowledge.

14. So far as my own practice is concerned, the mortality was about as the general average; and the months of the greatest mortality among my patients were March and October.

16. Our health officer, Dr. Horton, will probably answer.

17. No small-pox, cholera, cerebro-spinal meningitis, so far as I am aware.

18. I had the most cases of diptheria in January, February, and October. Intermittent fever in March, April, and September.

24. In town, twenty to thirty feet; in the country from twenty to one hundred feet.

26. June and July.

28. Mr. M. had a family of five children, four of whom had diptheria, and three died. The one who escaped the disease was, at the very first, sent from home, and out of the neighborhood. After the four had had the disease, the house in which they were ill was thoroughly fumigated with sulphur, the walls whitewashed, the bedding washed, the carpets aired, etc. In about three months after this, the little girl went home and spent a Sunday, and in about a week she was taken very sick with diptheria, but recovered. Did she take the disease from germs still remaining about the house? From a single case, this question cannot, of course, be answered; and I give it that it may be put with other cases of a similar kind. That diptheria is contagious there can be no question; that many physicians, and nearly all the people, underrate the danger of impure air and impure water there is not a doubt. As to this danger I will give two or three examples which have come under my notice during 1880. Four of a family of five children were taken sick with malignant diptheria and died. One was sent from home and escaped. I analyzed a specimen of the water they had been drinking for several weeks, and found it loaded with animal matter. A large drove of hogs had for several years been fed around this well, and they had a wallowing place within eight feet of it. The well out of which the family had previously, to a few weeks before, used water for culinary purposes, had given out, or else its pump had; hence, the use of this contaminated water. There had not been a case of the disease in that neighborhood, seven miles from Waterloo, for years, and there has been none since. A man in the country where there had been no diptheria for a long time, moved his old house to make room for a new one, over the wallowing place of hogs in a hog yard; his whole family soon had diptheria, three of whom died, and the one that took the disease first, slept directly over the filthy spot above mentioned. A family eight miles in the country had typhoid fever, where there never before had been a true case of the disease. I analyzed their drinking water, which was unfiltered cistern water, and the cistern itself had become filthy for want of cleaning out. The water was badly contaminated with organic matter. These, and many others of a similar

*The numbers at the beginning of paragraphs refer to questions in Circular 23B, pages 75-77.

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kind, which have come under my observation, convince me that there is no safety in the use of polluted water, or polluted air; that in towns, either the wells or privy vaults ought to be done away with; that in towns where public water-works which furnish pure water cannot be had, there is no better way to preserve wells from contamination than the dry earth or ashes system for privies, which can, in small cities, be managed with very little trouble, expense, and entire safety; and it seems to me, that this is one important direction in which the State Board of Health can, with great advantage, work, in the way of preventing contagious diseases and the consequent mortality. *Pure water, pure air, cleanliness—insured by force if they must be.*

Respectfully,

A. MIDDLEDITCH, M. D.

Waterloo, Black Hawk Co., March 28, 1881.

REPLIES FROM E. CARTWRIGHT, M. D., OF DECORAH, WINNESHIEK COUNTY.

*1. Estimated number of inhabitants in Decorah and suburbs, 4.559.

2. Deaths in 1880 from cemetery and undertaker's report, thirty-four, as near as I can estimate.

3. For the city and suburbs of Decorah.

4. About an average; have no record of previous years.

5. As in answer 4.

6. No epidemic; a few deaths from scarlet fever and diptheria in early winter.

16. In October diptheria appeared; small-pox, none; epidemic cholera, none; scarlet fever, 11; measles, 9; perhaps 20 cases; cerebro-spinal meningitis, none; diptheria, 13.

17. Five.

18. Greatest in October diptheria; can answer no farther.

19. In early part of November an epizootic among horses.

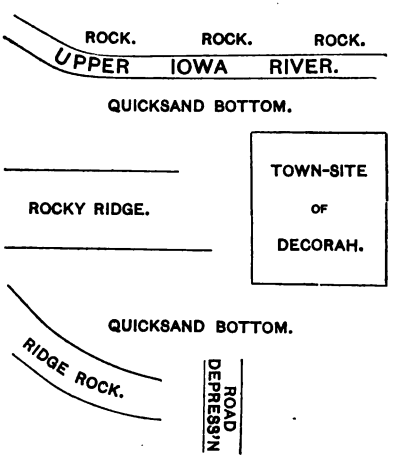
20. Have not the data.

24. On the bottom lands, 22 feet; on the rocky ridge, 60 feet.

We have to drill on rocky ridges from 60 to 80 feet before finding water.

Through the town is bed of creek usually dry in summer, called dry run from that circumstance, but last summer a small stream almost all the time.

On this quicksand bottom most of the wells are drive wells, and consequently water is clear; first we go through black vegetable mould four feet, then through a friable clay about fourteen inches; then gravel down to quicksand; but as privy vaults and drains become thicker how long before water becomes contaminated?



*The figures at the beginning of paragraphs refer to questions in Circular 23B, pages 75-77.

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28. Diptheria broke out here in October. A family had been visiting in Wisconsin. Their children went to the public school. The youngest child and her school-mate sat at same desk; were taken on Saturday and one died the following Tuesday. All our cases can be traced to this. All of these cases were isolated as soon as type of disease was known.

Yours,

EARL WRIGHT, M. D.

Decorah, Winneshiek county, April 7, 1880.

REPLIES FROM S. N. BIXBY, M. D., OF STRAWBERRY POINT, CLAYTON COUNTY.

*1. Cass township, 1,504.
2. .....
3. Radius of ten miles.
4. Greater; about ten per cent.
5. Greater; about ten per cent.
6. Diphtheria.
7. Bad sanitation.
10. Diphtheria.
14. November and December—high.
16. A few cases of whooping-cough; a few cases of typho-malarial fever; and quite a number of isolated cases of puerperal fever.
17. Small-pox and cerebro-spinal meningitis.
19. Hog cholera—autumn months; epizootic—November and December.
22-23. First months, soil unusually wet; last months, soil unusually dry.
24. Fifteen to thirty feet.
26. First months of year high.
27. Last months of year low.
28. In our town, when the diptheria was quite prevalent during November and December the ground water was near surface; soil sandy and porous. The drainage from manure heaps, and especially from privy vaults penetrates the soil, impregnating the drinking water in wells. Cisterns should be preferred to wells, and vaults should not be dug.

Yours truly,

S. N. BIXBY.

Strawberry Point, Clayton county, March 30, 1881.

REPLIES FROM H. N. SILL, M. D., OF STRAWBERRY POINT, CLAYTON COUNTY.

1. About seven hundred and fifty.
2. .....
3. About one and one-half miles square.
4. More.
5. One-ninth more.
6. Diphtheria.
7. I cannot; it was epidemic.
8. .....
9. .....
10. Diphtheria.
11. Diphtheria, epidemic.
12. Malarial.
13. September to November.
14. About September 10 to November.
15. .....
16. Diphtheria.
17. Small-pox, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis.
18. Diphtheria September, October and November. Others cannot.
19. Epizootic among horses in October and November. Lung disease among hogs from June to November.
20. Cannot.
21. Cannot.
22. None.
23. July and August.
24. About twenty feet.
25. From four to sixteen feet. Months, I cannot state.
26. July and August.
27. None.
28. Cannot.

In the year 1879, about or over one and one-half per cent died in our township; viz., out of one thousand five hundred inhabitants there were sixteen deaths.

I regret that I cannot give it with greater accuracy.

Respectfully,

H. NEWELL SILL, M. D.

Strawberry Point, Clayton County.

*The figures at the beginning of paragraphs refer to questions in Circular 23B, on pages 75-77.

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REPLIES FROM D. G. DARNELL, M. D., OF WEST UNION, FAYETTE COUNTY.

*1. Incorporated town. Population, one thousand five hundred and fifty.
2. About thirty.
3. The incorporated town of West Union and West Union township.
4. About the same as previous years.
5. Same as the average.
6. Diphtheria.
7. Our streets, alleys, etc., were not in a good sanitary condition. We had considerable rain during the latter part of April and May, followed by high temperature of atmosphere, hence, rapid vegetable and animal decay.
8. Typhoid and malarial fevers.
9. At the time of year those diseases prevailed, we had a much better sanitary condition in our town and township.
10. Diphtheria.
11. Answer in Number 7.
12. Typhoid and malarial fever.
13. Answer in Number 9.
14. During the month of May diphtheria; a high rate of mortality.
15. No disease but what we have had.
16. Small-pox, scarlet fever, cholera and cerebro-spinal meningitis we had none; typhoid fever, but a few cases; measles, twenty-five to thirty cases; whooping-cough, thirty cases; diphtheria, twenty-five cases.
17. Small-pox, scarlet fever, cholera and cerebro-spinal meningitis.
18. Diphtheria in May; whooping cough in April and May, and measles in January, February, March and April.
19. Cholera appeared among chickens the entire year, but no disease among animals.
20. The meteorological condition was about the same as usual, save in May we had a higher temperature than usual; also, in November, a lower one.
21. Cannot give positive answer, but last of May and during month of June we had an unusual amount of rain. August, September, October, January, February and March; December, November, July, April, May and June.
22. August and September.
23. June.
24. Average, fifteen feet. Some parts vary greatly, say from five to sixty feet.
25. During May and June, say about five feet; during August and September, about twenty feet; the other months about the average, fifteen feet.
26. May and June.
27. August and September.
28. Diphtheria was brought to our town by a lady and her children who were visiting East where the disease prevailed. The entire family had diphtheria. Those members who had it very mild were permitted to go about the streets. A neighbor's boy carried milk to the family daily when they were sick, and he was attacked and died in a few days. One member of the family went to school, as I understand, when others were sick with the disease. Measles and whooping-cough were brought to our town by persons attending our schools.

Very respectfully,
G. D. DARNELL.
West Union, Fayette County, May 16, 1881.

REPLIES OF N. S. CRAIG, M. D., OF MANCHESTER, DELAWARE COUNTY.

In response to your circular, allow me to state that I have been a resident of this place only since November 1, 1879, and, therefore, my answers will not be as complete as could be desired.

*1. The census gave us 2,270 population.
2. About twelve.
3. Manchester and vicinity—radius of four miles.
4. It was about the same as the average, though less than the year preceding, owing to the fact that diphtheria and scarlatina were prevalent in 1879.
5. About the same as the average.
6. None.
7. None.
8. As stated, we had very little fatal illness from diphtheria or scarlet fever in 1880.
9. To diminished intensity of disease, and to better (earlier) care in treatment.
10. None.
11. .....
12. None.
13. ... .
14. In the first six months of 1880 we had a mild form of diphtheria, attended with a very low degree of mortality.

*The figures beginning each paragraph refer to the questions in Circular 23B, on pages 75-77.

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15. None occurred.
16. (Opinion.) No small-pox or cholera; two or three of cholera infantum; two scarlet fever; one typhoid fever; no measles; four whooping-cough; no cerebro-spinal meningitis; twelve to fifteen diphtheria.
17. Small-pox, cholera, cerebro-spinal meningitis.
18. Have no sufficient data.
19. Hog cholera occurred in the latter part of the year in our vicinity, but was not unusually fatal.
20. Have no data.
21. Have no data.
22. Have no data.
23. Have no data.
24. Eighteen to twenty-four feet.
25. Have no data.
26. Have no data.
27. Have no data.
28. I saw a well-marked case of typhoid fever in May, 1880 (not included in answers to 2, 16, as it was fifteen miles away), in which, without doubt, the causation was the presence of decaying vegetable matter in the cellar. The house was very favorably located for drainage; privy-vault in good order and at suitable distance and location from the house; no decomposing matter about the surroundings; no other cases in the neighborhood. Cellar cleansed and disinfected promptly, and patient made a good recovery. No other cases occurred. May have a suggestion in this connection to make later.

Yours, etc., N. S. CRAIG, M. D.

Manchester, Delaware County, June 6, 1881.

[Another correspondent from Manchester, who omits to attach his signature, sends the following replies:]

*1. Incorporated town; 2,270 inhabitants.
3. Only a part of three townships.
4. Less. The people say *very* much less.
5. As near as I can learn, it was considerably diminished.
6. Diphtheria.
7. Excessive wet weather in the early part of summer.
8. I am told that scarlet fever was less prevalent.
9. Do not know cause.
10. Diphtheria and dysentery.
11. Both diseases appeared in very malignant form, and both physicians and laymen were not sufficiently acquainted with their natures to use sufficient precaution.
12. Scarlet fever.
13. It appeared in comparatively mild form.
16. Scarlet fever, 2; cerebro-spinal meningitis, 1; diphtheria, 16; dysentery, 4.
17. Small-pox, cholera.
18. *September, October and November*—Diphtheria.
August and September—Dysentery.
March—Scarlet fever.
May—Rheumatic fever.
June and July—Chronic diseases were most violent, and again in November and December.
Manchester, Delaware County.
May, June, July, September and October—Malarial fever.
19. *October, November*—All the horses had the epizootic, quite mild.
20. January, February, and March, very mild and not much rain or snow; April, May, and June, wet; July and August, dry and hot; September, wet and hot; October, cool and dry; November and December, very cold. There was an unusual number of heavy thunder-showers in June.
21. Until the middle of July, the soil was very wet; then, until the middle of September, very dry. Driest, August and July; wettest, June.
28. A young lady met a physician on a train, who had just attended some severe cases of diphtheria. In four days she was taken with a very severe attack. There had been no cases in the locality where she had been staying. Four of the family into which she went—or rather, where she remained during her sickness—were taken with the same disease.

In another instance, a young lady was taken with diphtheria away from home. She was removed to her home, and three other members of the family took the disease.

——— ———, M. D.

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*The figures at the beginning of paragraphs refer to Circular 23B, pages 75–77.

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REPLIES FROM J. W. RUE, M. D., OF DELHI, DELAWARE COUNTY.

*1. Five hundred and twenty-four inhabitants.
2. One-half per cent, about.
3. My practice is about five sq. miles, of about 2,000 inhabitants.
4. Sickness about the average of previous years.
5. The same as the average.
6. Consumption.
7. Cannot answer.
8. Diphtheria.
9. I think the atmosphere was not so moist generally.
10. Same as No. 6.
11. Changing from cold to warm being sudden, causing colds and check of perspiration.
12. See No. 8.
13. I cannot answer.
14. Consumption; *high rate* in February, March, and April.
15. Typhoid fever; rate low, January, February, and March.
16. Typhus fever, 3; typhoid fever, 6; whooping-cough, 2; cerebro-spinal meningitis, 2; diphtheria, 2; scarlet fever, 1. (These were in my own practice, and not taken from any other physician's.)
17. Small-pox, cholera—to my knowledge, not any.
18. Have not kept any memoranda.
19. Among hogs, 1, 2, 3 months, congestion of lungs. It has been estimated that 20 per cent died in this locality. Horses, epizootic, only 2 deaths; but most severe in spring and fall.
20. I cannot give particulars.
21. The season was generally a dry one; cannot state by the month.
22. May, June, and July.
23. Cannot answer.
24. In wells, the average is about 65 feet; there are some 100 to 180 ft. deep.
25. Cannot answer.
26. Cannot answer.
27. Cannot answer.
28. I think the disease among hogs is mainly caused by not having proper care. I have examined several that were fat, and said to have died with cholera. I found in each case the throat and lungs congested, while the intestines and every other organ was in a normal condition. I have also noticed that the farmers who have lost the most by what they have termed hog cholera, were those who let their hogs sleep in a pile, as it were, or too many together, and come out in an exposed place to feed. Being in a state of perspiration, the pores all open, of course a most violent cold is the result.

The remedy suggests itself: 1. Provide warm and dry quarters to sleep in, and a dry, clean place to feed in, not exposed to storms. 2. Not to allow too many to sleep together, thus avoiding so much heat and perspiration.

Speaking generally of diseases among the people, this is a wide field to roam in. One cause is—and one of great importance—not attending to the laws of hygiene. I find that there are fully one-half, if not more, who do not even bathe themselves once in two to four months. With this one simple duty neglected, how can people expect to be healthy? Also, interference with the laws of nature by *mechanical means*, as producing abortions, tight lacing, etc., which would fill a volume to enumerate in detail, and perhaps would be deemed superfluous to carry out your present ideas.

I am sorry that I cannot answer your questions more satisfactorily, my time is so much taken up by my practice. I will try and contribute to you as much as I can to aid you in carrying out your purpose for the best interest of the people.

Yours truly,

G. L. RUE, M. D.

Delhi, Delaware County, June 1st, 1881.

REPLIES OF GEORGE H. FULLER, M. D., OF DELHI, DELAWARE COUNTY.

1. This town not incorporated; population of township nearly 1,274.
2. Ten or twelve, I think; I have no statistics.
3. Delhi, township.
4. Ten to twenty per cent increase.
5. Same as number four.
6. Typhoid, typho-malarial, and pneumonic fevers in various combinations, and general debility from malarial and zymotic poison.
7. The open winter of 1879-80 caused freezing and thawing, and hence decay and giving off of poisonous effluvia by decaying vegetable and other organic matter accumulating in and upon

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75-77.

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the soil around dwellings. Our soil is sand or sandy loam, sometimes mingled with clay and gravel or limestone subsoil; usually drains well, and will receive a certain amount of organic matter without harm, but in an uncertain and varying period the soil around a house will reach the point of saturation, and then debility or more or less disease will be the result.

8. We had only sporadic, mild cases of scarlatina and diphtheria, and the cases of remittent form were mild and few.

9. The general settlement and cultivation of the soil is removing the malarial fevers, or modifying their forms. I do not know why we had less diphtheria, scarlatina, etc., though I think we are less liable than locations with a black, loamy soil; but other localities with soil similar to ours had such epidemics.

10. See answer to number six.
11. See number seven.
12. See number eight.
13. See number nine.
14. February and March. Typho-malarial fever and typhoid pneumonia; rate high.
15. Do not remember any such.
16. Scarlet fever, three or four; typhoid, four; and typho-malarial, two or three; whooping-cough, six or eight; diphtheria, twenty or thrity.
17. Small-pox, cholera (epidemic), measles, cerebro-spinal meningitis.
18. Have not sufficient memoranda to answer this.
19. Some "hog cholera" and "chicken cholera," so called, during summer and fall. Distemper among cats during fall and winter, which seemed analogous to typhoid fever.
20. Have not memoranda.
21. .....
22. .....
23. .....
24. Thirty to fifty feet; occasional wells twenty feet.
25. Have not memoranda.
26. .....
27. .....

In my opinion, a large proportion of cases of typhoid and typho-malarial fevers, pneumonia, scarlatina, diphtheria, cerebro-spinal meningitis, dysentery and diarrhœa would either be prevented or mitigated, and the general vigor of our population much increased, by a careful attention to the laws of hygiene, which are grossly violated by nearly every family. Great improvement could certainly be made, at a moderate trouble and expense, in the care of privies and excreta, and of kitchen and chamber slops, which, accumulating near dwellings and wells, and thrown upon a soil now so fast becoming saturated with organic matter, are constantly becoming more and more prolific causes of disease.

It seems to me that a cheap circular or pamphlet for general distribution among families, or for publication in the local newspapers, giving facts briefly as to how these things cause disease, and detailing practical *inexpensive* methods of avoiding them, such as families of moderate means could employ with a reasonable amount of trouble, would be of much benefit. An intelligent neighbor sets his privy on top of the ground, with no vault, has a box of road-dust and a trowel inside for constant use, and as soon as a wheelbarrow-load of the compost accumulates takes it to his garden or field. I use wood-ashes in the same way and have no odor or accumulations.

The same neighbor has a kerosene-barrel hung on a pair of old buggy-wheels so that it can be easily inverted; he lets it stand near the kitchen, where all kitchen and chamber slops can be thrown in it, and when half full, he easily wheels it on his garden and empties it. This I think much better than any spouts or pipes.

By calling attention authoritatively to these subjects, I think many residents of farms and villages would adopt some such means of protection. Occupants of tenement-houses, stores, etc., in our villages and cities, would doubtless need compulsion, and ought to have it.

GEO. H. FULLER, M. D.

Delhi, Delaware county, April 1, 1881.

* The figures at the beginning of paragraphs refer to Circular 23B, pages 75-77.

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REPLIES OF F. REYNER, M. D., OF EPWORTH, DUBUQUE COUNTY.

I send the following answers some of which are necessarily imperfect from the fact that no complete records were kept; as questions of this nature were not anticipated from any quarter, therefore only approximate answers can be given.

*1. Three hundred and fifty.
2. Three.
3. Taylor, Vernon, Iowa and Center townships.
4. About the same as the average.
5. About the same as the average.
6. Pneumonia.
7. No cause to assign.
8. Typhoid fever.
9. To short autumn and early advent of winter.
10. From none.
11. Cannot.
12. From none.
13. .....
14. Pneumonia; mortality very low.
15. Not any.
16. Small-pox, none; cholera, none; scarlet fever, ten; typhoid fever, fourteen; measles, none; whooping-cough, eleven; cerebro-spinal meningitis, none; diphtheria, unknown for the reason that many physicians call all sore-throat diphtheria, and so do the common people. But in the past five years I have found but three cases of what *I* called *diphtheria*. Many cases, that others called diphtheria, I called ordinary pharyngitis.
17. Small-pox, cholera, cerebro-spinal meningitis.
18. .....
19. Swine plague, during autumn months. The prevalence general, but not very severe.
20. As this place is only sixteen miles from Dubuque, I refer you to the reports of the United States Signal Station at that point, as furnishing more accurate information than my memory can.
21. January, February and March, soil very dry; August and September, dry; April, May, June, July, November and December, moist.
22. February and March.
23. .....
24. Twenty feet. At some places water can be obtained at fifteen feet, and perhaps a few rods from there you have to go down fifty or sixty feet; and the same is the case over all this portion of the county.
25. January, fifteen feet; February, sixteen; March, eighteen; April, twenty; May, twenty-eight; June, nineteen; July, nineteen; August, eighteen; September, nineteen; October, eighteen; November, seventeen; December, eighteen.
26. .....
27. March.
28. .....

Yours truly,

F. REYNER, M. D.

Epworth, Dubuque county, July 2, 1881.

REPLIES OF WILLIAM H. FRANCIS, M. D., OF CASCADE DUBUQUE COUNTY.

I will give the answers to the questions in your circular as correctly as is possible for me to do.

*1. Town of Cascade, Iowa; incorporated; number of inhabitants, 762.
2. About fifteen.
3. Within a circuit of five miles surrounding Cascade.
4. Population about the same; sickness about same as previous years.
5. About the same as previous years.
6. From old age and infants.
7. Natural causes.
8. Cannot say.
9. No greater or lessened prevalence.
10. As No. 9.
11. No unusual mortality.
12. Same as above No. 9, 11.
13. Mortality unchanged.
14. There being no high or low rate of mortality; the same as No. 13.
15. No unusual disease occurred in this locality.
16. Only one case of typhoid fever that I know of—a girl of ten years who died. There were no deaths from any other disease mentioned in this number, nor can I say that any of the diseases named appeared in this locality.

*The figures at the beginning of paragraphs refer to Circular 28B, on pages 75–77.

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17. No case appeared in any of the eight diseases except the one named, typhoid fever.
18. No definite statement.
19. Did not hear of any diseases among cattle.
20. Nothing unusual except the long winter and deep snows.
21. Cannot answer this question.
22. In no month of 1880 was the soil unusually dry.
23. Not unusually wet or moist in any month.
24. The variation in earth above the ground water in this locality is very slight to the water in wells, say forty feet on an average. A stream running through this locality called the Maquoketa River. In some parts of it the stream runs through bluffs twenty or thirty feet above the surface; in other localities the earth and surface of the water is nearly on a level, and the water shallow.
25. About same answer as No. 24; cannot say the number of feet and inches. In the month of March, at the time of breaking up of ice, the water rises from four to six feet, and in the month of June it rose six feet.
26. The same months each year.
27. In the month of August, September and October the water is lowest every year as it was in 1880.
28. In the fall we have some few cases of intermittent fever. The cause may arise from some little marshy lands in the vicinity of dams at flouring-mills; nevertheless we might have fever and ague without these swamps.

I must here mention that there is an old slough behind the town that is not conducive to health, but the contrary. Its water stagnates in the summer and fall months. The odor from it is very offensive, and in case of an epidemic of any kind it would contribute largely to its increase, especially cholera. Outside of this our locality is very healthy.

In the year 1873, in the months of January and February, we had a visitation of small-pox, which killed about forty patients, young and old—perhaps the half of all attacked.

Respectfully submitted.

WILLIAM H. FRANCIS, M. D.

Cascade, Dubuque county, Iowa.

REPLIES OF A. A. MATHEWS, OF DYERSVILLE, DUBUQUE COUNTY.

*1. Incorporated town; population, 975.
2. Twenty or twenty-five.
3. The territory included by a radius of three or four miles around Dyersville.
4. About the same.
5. About the same as the average.
6. I believe pneumonia.
7. .....
8. .....
9. .....
10. .....
11. .....
12. .....
13. .....
14. Cholera infantum in June.
15. February, diphtheria.
16. Typhoid fever, a few cases; whooping cough, ditto; diphtheria, the same.
17. Small-pox, cholera, scarlet fever, measles, cerebro-spinal meningitis.
18. *June*—Cholera infantum. *February*—Peculiar sore throat.
19. Disease among swine; very fatal in the summer and fall.
20. .....
21. .....
22. At no time.
23. In June and July.
24. Wells on this (east) side the river are from thirty to fifty feet deep; on the other side, which is more flat, from twenty to thirty.
25. .....
26. June.
27. No time.
28. Intestinal troubles in children which usually occur late in the summer, occurred here in greatest severity in June, when it was usually moist.

Regretting that my report is so incomplete, I am respectfully yours.

A. A. MATHEWS, M. D.

Dyersville, Dubuque county.

*The figures at the beginning of paragraphs refers to Circular 23B, on pages 75-77.

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REPLIES OF E. REITZ, M. D., OF SHERRILL'S MOUND, DUBUQUE COUNTY.

*1 I reside in Jefferson township, and also practice in adjoining town of Peru. Population of Jefferson, 1,585; Peru township, 1,071.

2. I have recorded seven deaths in my practice.

3. Territory of ten miles embracing Jefferson and Peru townships.

4. It was diminished thirty-three per cent.

5. It was less, about one to eighteen ratio.

6. Spasm: croup and cholera morbus.

7. Second month wet and foggy; seventh month hot and wet; also, eighth.

8. Cholera morbus less than 1879.

9. Because it was dryer in 1879 than in 1880.

10. From spasm: croup.

11. In four cases spasm—croup, called too late; one case tinea turned into convulsions and ended in hydrocelphgia; two infants with cholera morbus died in convulsions.

12. Cholera morbus.

13. The weather more favorable: intermittent febris symptoms generally fatal were not present.

14. Months four, five, six, nine, ten and eleven, none rate higher for rest.

15. No epidemic occurred.

16. Cholera infantum, twenty-seven cases; cholera morbus, fifteen cases; febris scarlet, sixteen cases; typhoid pneumonia, one case; diphtheria, twelve cases.

17. No small-pox, measles, whooping-cough nor cerebro-spinal meningitis.

18. Seventh and eighth months, cholera; twelfth month, scarlet fever; tenth month, typhus pneumonia; first, second and third months, diphtheria.

19. Among animals the hog disease made a clean sweep; horses were attacked with epizootic about the eleventh and twelfth months.

20. Noted nothing unusual meteorologically.

21. Dry fourth, fifth, eighth, eleventh and twelfth months; wet the rest.

22. Unusually dry the fifth and eleventh months.

23. Unusually moist second, seventh and ninth months.

24. Average about one hundred and forty feet

25. I made no estimate whatever.

26 Water in wells higher months seventh and ninth.

27. Low during the dry months.

28. I have found most cases of cholera induced by febris intermittent. Scarlet fever I have found in small, unclean houses where families of eight to ten were living without any ventilation; cellars with foul smell, and cisterns unclean, the family using nothing but snow-water. Diphtheria and spasmodic croup previling during the cloudy, foggy weather. So far, I believe, the disease was inhaled.

E. REITZ, M. D.

Sherrill's Mound, Dubuque county, March 28, 1881.

REPLIES OF R. M. WADE, M. D., OF FARLEY, DUBUQUE COUNTY.

*1. This town is incorporated. The number of inhabitants is four hundred and seventy-one.

2. Seven; four of whom were consumptives.

3. Six miles square.

4. Increase about twenty per cent.

5. Deaths increased ten per centum.

6. Lung diseases; many with consumption.

7. A number of those who died with consumption had it for years.

8. Scarlet fever and diphtheria.

9. Mild winter—almost no snow.

10. From consumption.

11. I cannot tell, unless this locality develops consumption.

12. Puerperal peritonitis; pneumonia.

13. Better remedies used by the physicians.

14. January, March and May, high; June, February, April, July and August, low.

15. No diseases of unusual occurrence in 1880.

16. (*a*) small-pox, none; (*b*), none; (*c*), fifteen cases, no deaths; (*d*), twenty-one cases of typhoid—one death; (*e*), no measles in 1880, but in this year more

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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than one hundred; (*f*), twenty-eight cases of whooping-cough; (*g*), none; (*h*), none, no deaths. This question is answered from my books, and returned as facts.

17. Small-pox, cholera, cerebro-spinal meningitis, measles.

18. *January*, scarlet fever;
February, typhoid pneumonia;
March, pneumonia, whooping-cough;
April and May, typhoid, peritonitis, lung troubles;
June, no prevailing diseases;
July and August, puerperal peritonitis, mumps;
September and October, remittent, whooping-cough;
November and December, typhoid pneumonia.

To give a summary of all diseases during the year would take a week of steady writing and would occupy too much space.

19. In the months of October, November and December about one-half of all the hogs died of what is termed here "disease of the lungs, or lung fever." No prevailing disease among cattle. Considerable lung trouble among horses, but only four or five deaths.

20. January—precipitation 1.37 in.; an unusually large proportion in form of rain.
February—precipitation .80 inches; unusually low, nearly all in rain.
March—precipitation 2.03 inches; rather low—little snow.
April—precipitation 2.70 inches; low.
May—precipitation 3.24 inches; low.
June—precipitation 6.30 inches; rather high.
July—precipitation 5.19 inches; rather high.
August—precipitation 5.26 in.; rather high.
September—precipitation 5.95 inches; rather high.
October—precipitation 0.42 in.; very low.
November—precipitation 1.87 inches; low.
December—precipitation 1.18 inches; low.

SUMMARY—During winter there was very little snow. The temperature was unusually high; roads and ground were very muddy. The atmosphere was often humid and fogs were unusually prevalent. In the spring the weather was changeable; temperature above average and though fogs and rains were about as frequent as usual, the total precipitation was light. The early summer was very dry, to the material injury of crops; but late summer and early fall were wet again, to the injury of crops. Late fall and early winter were generally clear, cold and dry.

NOTE.—Precipitations were taken from the records of T. V. Smith, of Farley, Iowa.

21. May, April, November, December and October, August, July, June, March, February, January and September.

22. Soil was unusually dry in May, April and March.

23. Soil was unusually moist in September and June.

24. Ground-water is an indefinite term in Farley and vicinity. Farley is on a divide between Little Maquoketa River and North Fork. Maquoketa River is 500 to 550 feet above the Mississippi at Dubuque, and is about 1,125 feet above the sea; and is the highest point within one hundred miles in any direction. The limestone is covered with glacial drift and one or two minor superficial formations to a variable depth, averaging say twenty-five feet. Water is usually found in limestone and drift, at an average (but very variable) depth of sixteen to twenty feet, though many wells are drilled in limestone. A slough or basin of gentle slope passes through the northeast part of Farley and passes into Hickory Creek, which creek flows into the north fork of the Maquoketa at Dyersville.

25. In the absence of recorded observations, it can only be stated that several wells in that portion of Farley within the basin described in the last paragraph were exhausted in May and early June. "Ground-water" is an indefinite term here

26. It is believed that wells have not contained an unusual depth of water at any time during 1880.

27. Wells were exhausted in May and early June more than usually occurs, except in uncommonly dry years.

28. This question is of a too general character, and open to controversy, for one to answer here, and is widely discussed in books. I have had no case in 1880 which would illustrate this question, but in the present year I have many illustrations.

R. M. WADE, M. D.

Farley, Dubuque county.

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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EASTERN DIVISION.*

REPLIES OF SAMUEL A. OREN, M. D., OF MOUNT AUBURN, BENTON COUNTY.

Not having kept a diary, I am unable to answer correctly and minutely some of the questions, but will impart such information as I now possess:

†3. Cedar township, Benton county, and Big Creek township, Black Hawk county, Iowa.

4. Greater by about ten per cent.

5. Greater by about ten per cent.

6. Diphtheria and dysentery (infantile).

6. Filth in drinking water (*opinion*). While July and August were dry, the wells became low, and then a little freshet flooded our section, filling up many of the wells with surface water. A dry spell then soon reduced them, and the water in many of the wells was very filthy. Diphtheria then broke out along mill-ponds and cess-pools, and was very fatal. Dysentery was prevalent during the hot, dry weather previous to the diphtheria.

8. All lung troubles.

9. To the steady weather.

10. Diphtheria and (old age) diseases among old people.

11. Lung and typhoid, as well as malarial fever generally.

13. Absence of malarial effluvia.

14. *January to April*—Gastro-enteritis and bronchitis, which was low.
May and June—Malarial fevers and infantile bowel troubles generally—average.
July and August—Dysentery, which was above average as respects fatality.
Then came diphtheria, which lasted until about the middle of December, and was quite fatal.

16. One case of scarlet fever in August; 2 cases of *mongrel* typhoid fever in September; 12 cases of whooping-cough, 29 cases of diphtheria.

17. Small-pox, cholera, measles, and cerebro-spinal meningitis.

18. *January*—Bronchitis, gastro-enteritis.
February—Bronchitis, gastro-enteritis.
March—Bronchitis, gastro-enteritis.
April—Gastro-enteritis and bronchitis.
May—Malarial fevers, dysentery.
June—Dysentery, fevers.
July—Dysentery and enteritis.
August—Dysentery and enteritis.
September—Ephemeral fevers, malarial fevers, diphtheria.
October—Diphtheria, ephemeral fevers.
November—Diphtheria, ephemeral fevers.
December—Diphtheria and ephemeral fevers.

19. Epizootic among horses, which commenced about September, grew worse to the middle of November, and then gradually faded away. Quinsy at the same time among hogs, and iritis among horses and cattle to some extent. These diseases came and went with our diphtheria; and I am familiar with the facts that before we had diphtheria in the first family, *their* horses had the epizootic, and hogs the quinsy, prior to and at the time diphtheria broke out with them. Horses had epizootic, and people diphtheria, about Traer, Tama county, much sooner than we had it; and the epizootic was first brought into this neighborhood by men running threshing-machines from those parts in Tama county. I believe that the diphtheria in man, quinsy in hogs, and epizootic in horses, depend on the same or about the same influence and general or common cause.

20. February, wet; July and August, dry; September and October, changeable; November and December, cold. (This question the observers, of whom Prof. Hinrichs, of Iowa City, is at the head, can answer correctly.)

21. July and August were dry; February wet. (Defective.)

22. July and August.

23. February, March, and October.

24. Twenty-two feet.

25. Too obscure to answer. It varies from six feet to twelve and fifteen.

26. February, March, September, October.

27. July and August.

28. See note under question 19.

Yours respectfully,

SAMUEL A. OREN, M. D.

Mount Auburn, Benton County, April 2, 1881.

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*For counties comprising this division, see page 79 and map.

†The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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REPLIES OF N. JASPER JONES, M. D., OF BLAIRSTOWN, BENTON COUNTY.

*1. Incorporated town. Population, 652.

2. Nine.

3. Blairstown and six miles each way therefrom.

4. About the average.

5. Same as No. 4.

6. Cholera infantum, scarlet fever, and measles.

7. Extreme heat for cholera infantum, and infection for scarlet fever and measles.

8. Measles and diphtheria.

9. The dry season, I think, had an influence on diphtheria. There was but one case of measles, which was kept isolated.

10. Cholera infantum and dysentery.

11. Extreme heat.

12. Diphtheria, scarlet fever, measles.

13. Cases were milder.

14. From July to September 15th. Above the average.

15. Scarlet fever, in January; whooping-cough June to December; measles in February and March.

16. (Here I can only give my opinion.) Scarlet fever, about 120 cases, including cases holding on from December, 1879; whooping-cough, about 100 cases; diphtheria, 60 cases, about; nearly everybody had influenza in November or December; measles, one case only.

17. Small-pox, cholera, and cerebro-spinal meningitis.

18. *January*—Scarlet fever and pneumonia.

February—Pneumonia, scarlet fever, measles.

March—Pneumonia, measles.

April—Pneumonia, peritonitis, gastralgia.

May—Pneumonia, cholera morbus.

June—Bilious fevers and whooping-cough.

July—Cholera infantum, whooping-cough, and dysentery.

August—Cholera infantum, whooping-cough, dysentery, pelvic cellulitis.

September—Whooping-cough, dysentery, puerperal insanity, insanity, pelvic cellulitis.

October—Whooping-cough, dysentery, ophthalmia.

November—Pneumonia, whooping-cough, influenza.

December—Pneumonia, influenza, dysentery.

19. Hog cholera during the greater part of the year, affecting one-third to one-half of all the hogs; epizootic affecting all the horses, in November and December.

20. Have no minutes by which I can do so.

21. June, wells dried up; July, August, May, January, March, February, April, September, December, November, October, wells filled to within two feet of ground (top) and cellars overflowed.

22. In June and July.

23. October and November.

24. Twelve to fifteen feet in Blairstown, but in the country, back from the creeks, it is from eighteen to twenty feet.

25. Can only estimate it from my own well. January, 19 feet; February, 18 feet; March, 17½ feet; April, 17 feet; May, 20 feet; June, 23 feet (well dry); July, 21 feet; August, 22 feet; September, 19 feet; October, 2 feet; November, 4 feet; December, 12 feet.

26. October and November.

27. June and July.

28. Measles was brought here by a child having been exposed in Brooklyn, Iowa, to the poison. Whooping-cough was brought in a similar way. Scarlet fever was contracted in the vicinity in 1879, in the usual way.

To conclude: The spread of all contagious and infectious diseases should be controlled by specific legislation, making it a misdemeanor for parents to permit their children to attend school, church, or any public gathering, or even to run on the streets, while said children are affected with any such contagious diseases. Compulsory vaccination and revaccination at stated periods would be very apt to root small-pox out of the country. And in case one of these diseases occur, the residence should be marked—say, with a red flag—as a sign of infectious or contagious disease. It should also be a misdemeanor to permit vegetables to remain in the cellars after rotting. School-houses and churches should be declared a nuisance unless well warmed and properly ventilated.

This has been a hard task, and I can but feel it has but poorly been performed. However, I have done my best, and respectfully submit the same. Awaiting your pleasure, I am,

Yours truly,

N. JASPER JONES, M. D.

Blairstown, Benton county, March 29, 1881.

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75-77.

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REPLIES OF J. F. ESHER, M. D., OF LOWDEN, CEDAR COUNTY.

*1. The population of our incorporated village, Lowden, is about five hundred and seventy-five.

2. There were only two.

3. The village of Lowden, the south half of Massilon and the whole of Springfield townships, in part of both of which our village is located (all in Cedar county).

4. About the same as in previous years.

5. Ratio of deaths fully fifty per cent less than in previous years.

6. Follicular stomatitis was more than usually prevalent, but in no case coming under my notice did it produce death.

7. Probably the same epidemic influences that made diphtheria so general throughout our State.

8. We have not had any disease particularly prevalent in previous years.

9. .....

10. Probably from pneumonia, and from that there were only two deaths.

11. Infancy and old age.

12. From so few deaths, and being here only a limited time cannot say.

13. .....

14. August, September and part of October; considerable cholera infantum without any deaths, to my knowledge. October and November, follicular stomatitis; some very severe cases, often called diphtheria, but no deaths.

15. Follicular stomatitis October and November.

16. Typhus fever, three; and there were said to be three cases of scarlet fever in our village, yet circumstances lead me to doubt the correctness of the diagnosis. There was, as above stated, an epidemic of follicular stomatitis.

17. Small-pox, scarlet fever(?), cholera, measles, whooping-cough, cerebro-spinal meningitis, diphtheria.

18. *January*—Remittent fever, intermittent fever, pneumonia.
February—Fever and pneumonia.
March—Fever and pectoral trouble.
April—Intermittent and remittent fevers, general exhaustion and rheumatism.
May—Throat trouble, general exhaustion, remittent fever.
June—Same as May.
July—Remittent fevers, stomatitis, diarrhœa.
August—Fevers, remittent and intermittent; cholera-morbus, stomatitis.
September—Cholera-infantum, fevers, stomatitis.
October—Stomatitis, fevers, cholera-infantum.
November—Stomatitis, remittent fever, chest diseases, typhus fever
December—Fevers, pneumonia, stomatitis.

19. Cerebro-spinal meningitis among horses; some by cholera; and a few cases of pneumonia among the horses. The period at which either of those diseases was most common I cannot say, as it was only incidentally that a knowledge of them was had.

20. January, February and March were mild, with occasional light snows and rains, but on the whole pleasant and dry. April and May were average warm and more than commonly dry. The first part of June was dry, but the last part, together with July and a part of August, were rainy and warm in fact uncommonly warm. September, warm and first part wet and rainy. October, first part cold and wet, continuing through the most of the month, but latter part dryer and a little more mild, as well as the first ten days of November, after which it froze up with continued cold light snows the remainder of 1880.

21. May, April, January, February, March, November, December, October, September, June, July, August.

22. First three months.

23. June, July and September.

24. From three to eight feet.

25. January, eight; February, eight; March, seven; April, eight; May, eight; June, five; July, August and September, three; October, five; November and December, seven.

26. June, July and August.

27. January, February and March.

28. We have had no communicable diseases, except some three cases of fever of a typhus nature, and they occurred at a farm-house where the drinking water was obtained from the most unfavorable possible locality—a surface slough well in the center of a slough receiving all the drainage from the house, out-house, barn-yard, pig pens—in fact all the refuse matter ever found about a farm.

Respectfully,
J. F. ESCHER, M. D.

Lowden, Cedar county, March 23, 1881.

* The figures at the beginning of paragraphs refer to Circular 23B, on pages 75-77.

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REPLIES OF S. K. KEITH, M. D., OF MECHANICSVILLE, CEDAR COUNTY.

*1. Mechanicsville, 545 inhabitants.
2. Eight.
3. Pioneer and Linn townships, and west half of Fremont township.
4. The same.
5. Greater; about 25 per cent.
6. Whooping-cough, with pneumonic complications.
7. Cannot assign cause.
8. Less; typhoid fever.
9. Offer no opinion.
10. Whooping-cough, complicated with pneumonia.
11. ....
12. Typhoid fever, cases generally of a mild type.
13. .....
14. Deaths from whooping-cough and pneumonia were about 50 per cent greater than usual in the same disease. This was with children under five years of age.
15. April and November; one case in each month of cerebro-spinal meningitis.
16. Small-pox, 0; cholera, 3; scarlet fever (estimated) 25; typhoid fever 6; measles. 0; whooping-cough (estimated) 150; cerebro-spinal meningitis, 2; diphtheria, 15.
17. Small-pox and measles.
18. *January*—Pneumonia and croup.
February—Pneumonia.
March—Pneumonia, rheumatism and diphtheria.
April—Bilious fever, cerebro-spinal meningitis.
May—Intermittent fever.
June—Intermittent fever.
July—Intermittent fever, diarrhœa.
August—Cholera infantum, dysentery.
September—Whooping-cough, typhoid fever.
October—Whooping-cough, autumnal fever.
November—Whooping-cough, scarlet fever and cerebro-spinal meningitis.
December—Whooping-cough, scarlet fever and diphtheria.
19. October, November, and December. Hog disease. Had good opportunity to observe the disease and diagnosed it as *pneumonia*. The cough and respiration were characteristic of pneumonia (physical signs). Post mortem presented the pathological signs, *hepatized lung*. The bowels were constipated.

The disease was prevalent and about one-fourth of the hogs died. Some farmers lost most of their stock, while others lost only a few.

In November the horses had the epizootic in mild form.

My attention has been called more particularly to the swine disease the past season than ever before, because I lost 25 shoats and two old hogs from it. The first symptom of illness was cough; 2d, frequent and labored respiration attended with a noise which the farmers in this vicinity call "*thumps*"; 3d, loss of appetite and great thirst; 4th, emaciation. The bowels in some cases were loose, but a majority were constipated, and the fœcal matter in hard balls (scibula).

From all that I can learn of the swine disease, I conclude we have cholera and pneumonia, and my observations have been on the pneumonic type.

As to the *contagious* character, I say it is *epidemic*.

Poor care and exposure have much to do with the spread of the disease of the pneumonic type. The almost exclusive corn diet, accounts in part for the choleric type. The digestive organs fail to perfectly digest the food, and the undigested portion is an irritant to the mucous membrane of the bowels, hence the choleric discharge.

I have made no microscopic examination. I directed the man on my farm to make a *post-mortem* examination. He reported hard fœcal matter in the intestines, and lungs shriveled and dark colored."

Had I expected to have been called upon by the State Board of Health, I would have made a careful *post-mortem*. As it is I can only give you the facts as they are observed and as they were reported.

Influence of diet and care. When I had lost 19 shoats out of a lot of 28 in November, 1880, I directed the nine left brought to my barn. Six were sick, and soon died. The remaining three were fed on boiled potatoes with oat and corn meal, mixed with them, and kept in a dry, warm pen, and have continued to thrive to the present time.

No suspected meat has been eaten in this vicinity, hence cannot tell the effect of eating the diseased meat.

As to theory as to cause, or causes of the swine disease, I attribute it

1st. To the too restricted diet of corn.

* The figures at the beginning of paragraphs refer to Circular 23B, pages 75–77.

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2d. Too large a number in one lot.
3d. Continuing to keep the hogs in the same lot or pasture without changes.
4th. Keeping too many in the same lot at night to lie on one another.
5th. Poor and wet places to sleep, exposed to wind, rain and sleet.
As a remedy I suggest:
1st. Small lots of hogs together.
2d. More diversified diet, with much less corn.
3d. To run with the cattle in the winter.
4th. Large range in summer, with fresh water.
5th. Dry and protected place to sleep the year round.
20. .....
21. August, July, October, November, September, December, June, January, February, March, April.
22. August and September.
23. May and April.
24. Twenty to twenty-five feet.
25. .....
26. May and April.
27. August and September.
28. Scarlet fever communicated to a school by a pupil.

A mother with two children visited friends in Clarence, Cedar county, where the children were complaining of sore throat. On returning to her home in Fremont, and five days after the exposure, her own children came down with diphtheria.

Yours truly,

SAMUEL KEITH, M. D.

Mechanicsville, Cedar County, March 24, 1881.

REPLIES OF J. B. M'LAUGHLIN, M. D., OF DELMAR, CLINTON COUNTY.

*1. Four hundred and ten.
2. Ten.
3. Delmar and vicinity.
4. Average or perhaps less.
5. Greater, perhaps one-fourth.
6. Diphtheria.
7. .....
8. .....
9. ....
10. Diseases of the lungs.
11. .....
12. .....
13. .....
14. .....
15. .....
16. Three or four cases of scarlet fever, five cases of typhoid fever, one case of measles; all in the city. There were not less than fifty cases of diphtheria in this city and vicinity. I have no way to get the exact number.
17. Small-pox, cholera, whooping-cough, cerebro-spinal meningitis.
18. Diphtheria, October to December, and occasional cases all through the year; pneumonia, December to March; cholera-infantum and cholera-morbus July, August and September.
19. Hog cholera (so-called) prevailed in November and December; quite a number died, perhaps one-fourth as many died of the disease in the year 1879. A great many fowls died during the warm season of the so-called chicken cholera.
20. I cannot find any record of the matter sufficient to give a correct statement.
21. It was very dry in August, May, July and September; but little rain in March. The last of May and first part of June was very wet; the wells were full. Heavy damage was done by the water. (19 and 21 I obtained from the diary of S. S. Norton.)
22. .....
23. .....
24. Depth to water in wells will average about twenty feet.
25. .....
26. .....
27. .....
28. .....

I have made inquiries among the people, and gathered all the information I could on the subjects, and answered all the questions I can in the absence of statistics regularly kept. Yours, etc.,

J. B. MCLAUGHLIN, M. D.

Delmar, Clinton county, May 14, 1881.

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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REPLIES OF E. BRENDEL, M. D., OF CEDAR RAPIDS, LINN COUNTY.

As I think, the labors of the Board are to be continued for years to reach the indicated aim; the incoming reports will be sifted and scrutinized in the strictest manner. Hardly anybody will be prepared at present to give full satisfaction. So I suppose you will receive but "frustulæ," which may be of value. During the year one or the other may be interested enough to carry on proper observation, which I promise to do as far as my ability reaches. For the present the following remarks:

The city of Cedar Rapids is located on alluvial sands at an average level of twenty feet above the bedrock of Cedar River, which bedrock is of Devonian age.

Wells sunk are mostly what they call drive-wells, of a pipe length of some fifteen to twenty feet, where the pipe strikes, after passing the surface sand, a bed of clay, slough clay—that is, clay formed by the heavy mineral parts of decayed water plants (mostly silicates and sulphates of aluminin), enclosing twigs and partly decayed wood, remains of insects, etc. This clay is from one to three feet thick. The formation of slough clay is still going on in a slough of an area of about eighty acres, situated west-northwest between the river and the town. Below this clay is found again sand, alternately with perhaps another bed of clay, still the sand (water filter sand, quicksand) is reached at about twenty feet depth, except on some locations where the overlaying sand strata are higher (as for instance near the college building) fifty feet or lower (as on the west side of the river where the water is but twelve to fourteen feet below the surface with a top layer of one to three feet blackish garden soil).

I conclude that the bedrock of the river must be a nearly level stratum inside the city limits. Water found above one, or between the layers of clay, is usually unhealthy (miasmatic) like the slough water above mentioned in the neighborhood of which intermittent fevers are prevailing. But as such wells are found nearly all over the town the character of the intermittent or remittent is stamped on most any disease, one may say, throughout the year; even in winter the catarrhal and inflammatory diseases of the respiratory organs are stained with it.

As a rule in spring time the miasmatic diseases affect the respiratory and alimentary canals equally, but the affection is milder and of a shorter duration than in autumn.

The probable cause of it is, that products of decay of the winter accumulation of garbage is faster used up by the growth of the new vegetation and occasional rain, than in autumn when, especially after a dry summer. this garbage, together with the withering of plants by the general involution of the season produces copious miasmas (in our alleys). The alimentary apparatus is then mostly interested.

As I have not kept a journal the last year, and do not like to produce the notes of others respecting question 16, I must refer to Dr. H. Ristine, who I think kept a record of diseases occurring in his large practice.

Respecting schools I may first but mention that the heating of school-houses in winter admits a good deal of pious wishes touching the equal distribution of temperature in the rooms. The furnace heating seems to have not reached a perfectness. But for that I think an architect could furnish a better criticism.

Strict rules should be given to be observed by the teachers in regard to the timely attention of children to the necessary functions of relief to prevent as much as possible undue disturbances during school hours. But no child should be kept in the room (as it is very often the case, if not the rule with some teachers) whenever necessity demands to let the child go out. That is all well known to everybody, still it is needful to bring it to recollection.

The method of writing on the desk is here rather abnormal. At least I did not notice the like in Illinois schools. It is this: the child sits sideways, with the forearm on the desk, pushing the shoulder upward while the other shoulder hangs down so far as to rest the elbow on the thigh. In case children have to write for a long time and acquire the habit of such a posture for the rest of their lives, perhaps make writing their business, the weight of about one-sixth of their body supported by the ligaments of the shoulder joint, and the teres muscles, will finally produce subluxation of the humerus upwards. the partial relaxation of the trapezius, levator anguli, rhomboideus on the scapula, the sternocleidomastoid —in short the whole set of muscles—keeping the scapula and clavicle up and backwards relaxed, the pectoral and deltoid strained, act as a lever to lift the scapula

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far outward and backward. The spine curved sideways, and the muscles of one side of the neck relaxed, the neck bent to the opposite side, hinder the circulation and the expansion of the chest. It is clear that such a posture will, in the end, cripple the best constituted body, injuring spine and lungs. But what may be the cause for such a most ungracious, lazy looking attitude, methodically carried out? Some excuse could be furnished by the narrowness and lowness of the seats, which are made for small children, not for lanky boys and girls of 4.75 feet high, if such an deculpation is admissable.

I am, sir, very respectfully,

Yours truly,

E. BRENDEL, M. D.

Cedar Rapids, Linn county, March 31, 1881.

DIPHTHERIA IN WAUBEEK, LINN COUNTY, AND VICINITY—REPORTED BY WARD WOODBRIDGE, M. D., HEALTH PHYSICIAN OF WAUBEEK.

Diphtheria is prevailing in the village of Waubeek and vicinity, now, for the fourth time in two years and three months. In August, 1879, it made its first appearance in twenty years, and at that time the first case appeared in a family out of town. There was no school, and as far as could be told the case was one of spontaneous development. It proved fatal, and all the other members of the family, including the mother, the father being at that time in the Black Hills, were attacked with it, but all recovering. At the same time, a serious epidemic was prevailing in Cedar Rapids, and the next two cases were undoubtedly imported from there, both proving fatal. There were a few light cases following, and it declined. The people knew nothing at all of it, and sympathizing with their neighbors visited them, and public funerals were held. Proper cautions were not taken in cleansing, etc., and in December following another and more severe epidemic broke out, resulting in fourteen deaths. Two physicians, Drs. Crawford and Gremm, were here at the time, and battled manfully with the disease, Crawford being an able young man, Gremm an "irregular." At the time this epidemic prevailed, I was away at school and no record was kept of it. So my facts have to be gathered from any and every source available; but there was no importation in the beginning of the second epidemic. There were a few unimportant cases following in the fall and winter of 1880 and 1881. In April, 1881, I settled in Waubeek, in Dr. Crawford's place. Dr. Gremm having previously moved away. June 14th, on returning home from the meeting of the Iowa Union Medical Society, I was summoned to see a child fourteen years of age, and found him suffering from a very severe attack of diphtheria. This case occurred at school, as did, also, the first case of the second epidemic referred to above. My first case was in the family of a merchant of the town, and both he and his wife came down into the store from the sick room (living over the store), and I am told that the mother of the next case was in the store with her two children, aged aged two and one-half years, and eight months, respectively; and that the lady took the children in her arms. This she denies to me, so I give it for what it is worth, which is not much, as we shall see presently. The first case made a good recovery, but the next two were fatal, one dying of diphtheritic laryngitis. From this, the disease spread, and seven cases proved fatal in the village and five around it. Some rather remarkable evidence of its contagiousness may as well be spoken of here. A little girl, aged about ten years, had some relatives living in town, and she came to stay all night with them. In the night one of the children was taken sick with diphtheria. She returned home, went to school, and in five days took sick at school. Six days following, two cases occurred in two separate families, and soon two more, all proving fatal. The little girl first taken made a slow, tedious recovery. A baby in the same family died with it. There were forty-one cases in all. The disease gradually declined, and in six weeks had entirely disappeared. During its prevalence, I tried to impress on the people the necessity of using great caution. No public funerals were allowed, and everything used about the sick burned or thoroughly smoked with sulphur fumes and then washed. October 8th I was again called to see a case, which took sick at school. On returning home, I sent my own children at once to their grand-parents, to isolate them from it if possible, but on the evening of the 7th my girl, aged eight, was taken sick with it, and died the morning of the 10th, and to-night, as I pen these

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lines, I am watching over another one of my children lying very sick with it. There have been, so far, thirteen cases, with three deaths, and it is still raging. This makes fifty-four cases which have been in my hands since the 14th of June, with fifteen deaths. Now this epidemic has not by any means been confined to Waubeek and vicinity, but has been all around us, both in towns and country.

The village of Waubeek is situated on the southwest bank of the Wapsipinicon River, Maine township, Linn county, Iowa, and contains about three hundred inhabitants. The ground is lower than it is west and northwest, but on a level south and southeast. It is located on a ledge of rocks, which in places crop out, and there are several fine rock quarries in and around it. There is a fine farming country all around the village, except to the east, and a community of good, intelligent farmers. There is a good water privilege and a mill; a creamery in almost the center of the town, to which I shall have occasion to refer again. It is not, strictly speaking, a thrifty village. While there are a great many industrious people, there are, also, a great many who seem to live from hand to mouth; and some rather untidy housekeepers, which, of course, is very inviting to contagious and infectious diseases. Malaria enters largely into all forms of sickness throughout the community, either primarily or as a complication. In very many of the cases of diphtheria I have noted the intermittent character of the fever, and often more than the initial chill, with gastric irritation, showing distinctly, it seems to me, that malaria is adding to the severity of the disease. The health of the community in general, this year, has been at a very low standard—or, in other words, "below par." Neuralgia, rheumatism, gastric catarrh, malarial and typhus-malarial fevers. Erysipelas sores not healing kindly, but persistent and stubborn, have been prevailing to a much more than usual extent for the past six months. Scarlet fever has also prevailed about eight miles south of us, to some extent.

We refer to the well-known physical law, "That no effect can be the result of a single cause," and so I fully believe in regard to diphtheria—that no single cause for it will ever be demonstrated; but, rather, that a multiplicity of causes will always be found operating for its production. I do not refer to the specific character of the disease; for that, of course, is well defined, but to the causes operating to bring on an epidemic. I see the United States Board of Health agree that it is at first a strictly local disease. With the greatest respect for the opinions of those very able gentlemen, I am not prepared to agree with them. On the other hand are very able and experienced investigators who maintain that it is *always* primarily a constitutional disease, with a local manifestation. This I also deny. I think the "golden mean" is to be found between the two extreme opinions; viz., that a great number of cases are primarily constitutional, and the throat symptoms secondary. Others, again, manifest very mild throat symptoms, with little or no constitutional disturbance. Very often I have seen cases start out with the gravest constitutional disturbance; intense fevers, reaching 105° F., pulse 140°, or even higher, with great prostration, aching head, back and limbs, and profound disturbance of the nervous system, with the throat symptoms entirely in abeyance for twenty-four or thirty-six hours, and the cases proceed rapidly to a fatal termination. This, it seems to me, could be accounted for in no other way than that the diphtheretic virus had invaded the whole economy, and that the onset of the disease was so violent as to be incompatible with life. I remember one case very distinctly, of this kind, in which the membrane on the tonsils never exceeded the size of the thumb nail, yet it was fatal. Perhaps it is unwise to occupy space in arguing this point further, and is of no use for me to attempt to speak of the specific character of the virus—to tell what it is, or what it is not. Volumes have already been written upon it. The question is: Why does it prevail so often, persistently and fatally about Waubeek? First, the influence of contagion must be admitted. We cannot, of course, tell the manner of its operation. Can we even say that it is capable of being widely diffused? It seems to hang around certain places and things, in a manner perfectly surprising. I have said that it was not confined to Waubeek and its vicinity. It is prevailing now in and about Anamosa, twelve miles distant; in and about Springville, eight miles distant; and in the country eight miles west and northwest; also, to some extent, in Marion and Cedar Rapids, but not to the extent that it has in our vicinity. It was in Cedar Rapids before it appeared in Waubeek. There are no swamps near our village; no new land being broken up; but all under a high state of cultivation. The creamery spoken of above, was not kept in the best possible condition. There was a cistern to receive the sour milk, which was allowed to go foul. The owners were requested to clean it out, and wash it with

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copperas water once a week, which they very kindly did. The mill-dam was injured during the high water in the spring, and a new water-course cut its way through and left the old bed lying next the town, with some stagnant water in it. The mill company repaired it, and it is now full of water, removing that possible source of infection. Nearly all the drinking water is from wells drilled from forty to sixty feet in the solid rock. Indeed, I cannot see that there is anything in the village, or its surroundings, that specially invites the contagious germ of diphtheria, that they do not have in all the towns and villages about us, and so they have diphtheria too. It certainly was not carried from Waubeek to them. So, there must be a multiplicity of causes, with health generally at a low ebb.

The prevalence of disease of all kinds, and especially of an infectious character—for even typhoid fever has been prevailing southwest of us to an alarming extent—will show the causes can hardly be atmospheric, as it will break out, and run four or six weeks, then decline, and nothing more be heard of it for a longer or shorter interval, when it will break out again. Moreover, an epidemic will be declining in one place, at its height in another, and commencing in another. So, it would seem that whatever the circumstances are that so favor its development and progress, they could not bring it about without the presence of its own peculiar contagious germ. (Some gentlemen may object to the term, germ; they may call it something else.) So epidemic and contagion could hardly be separated. There are isolated cases occurring all the time. Sporadically—sometimes one; sometimes a few in a place. Only last week a girl fifteen years old died with it, and no case had been within five miles of the locality for three months, they living in the country, several miles from all towns. Thus, after all, we are obliged to say that the diphtheretic germ is present with us, and that occasionally an assemblage of circumstances favor its development, and that the nature of both are unknown to us. In its nature it is worse than scarlet fever, for it is sporadic, epidemic, and contagious; and there seems no possible escape from it. I am often asked, as I presume all physicians are: "Is there no preventive?" My invariable reply is: only, to get the general health up to as high a standard as possible, so that in case an attack should come, perhaps it may lighten it. It is a terrible scourge, snatching away the youth, beauty and promise of our land, and the disease is assuming alarming magnitude, not only with us, here in this vicinity, but all over the country, and in fact the world. There have been, in the two years and three months, twenty-nine deaths in and around Waubeek, and doubtless as many more in a radius of ten miles. It will be a happy time for the human family when the profession find some plan of treatment that will more nearly control it than any now known; but at present there is a large class of cases, and doubtless always will be, that the medical arm is too short to reach; for when we reach the point when science is equal to disease, death will be banished from the land—a point inconsistent with nature, and never designed by "Him who doeth all things well."

Respectfully and fraternally yours,

WARD WOODBRIDGE, M. D.

Waubeek, Linn county, October 24, 1881.

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REPLIES OF J. S. WATTS, M. D., OF MILLERSBURG, IOWA COUNTY.

*1. Not incorporated.

3. Two-thirds of English township; three-fourths of Dayton township; most of Pilot township; one-half of Lincoln township; all in Iowa county.

4. Less. Perhaps an average amount including the whole year, but less during greater part of it.

5. Perhaps as many or more deaths than the average.

6. Dysentery. In children under two years it was accompanied with gastric trouble resembling therein cholera infantum, and was fatal in from three to five days.

8. Notably typhoid fever, which occurred in but one family in the country. In the village of Millersburg there were more cases than usual. It originated in a family living almost constantly in a single low room, with the surroundings all bad, such as water under the house, filth on the outside. But one or two other persons had it, and it was clearly traceable to the one family. This town is usually exempt from it.

10. In the early part of year there were three or four deaths from pneumonia in adults. All were women. This is unusual here.

12. Typhoid fever.

13. Fewer cases than most years.

14. From July 15th to August 15th. Dysentery.

16. Scarlet fever; perhaps ten or twelve. Typhoid fever, twelve. I think diptheria was not prevalent. A few sporadic cases, but no fatality. Cannot give the number.

17. Small-pox, cerebro-spinal meningitis. Do not remember either measles or whooping-cough, but am not positive that no case occurred, but think not.

18. Cannot answer.

19. So called hog cholera.

To many of your questions cannot give a definite answer. In general way am only able to say the summer and fall were both dry. Water is usually found from fifteen to twenty feet below the surface. Last fall it was nearly twice as far. If you are not able from other reports to approximate the truth in regard to meteorological conditions, I will endeavor to answer any special questions you may ask.

Yours, etc.,

J. S. WATTS, M. D.

Millersburg, Iowa county, April 29, 1881.

*The figures at the beginning of paragraphs refer to questions in Circular 23B, pages 75–77.

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SOUTHEASTERN DIVISION.†

REPLIES OF W. S. ROBERTSON, M. D., OF MUSCATINE.

*1. Incorporated city of 8,294.
2. .....
3. The city of Muscatine, Iowa, and suburbs proper.
4. Probably greater; increased by epidemic scarlet fever.
5. Probably greater, from scarlet fever epidemic.
6. Scarlet fever.
7. Carelessness of the lower classes in not permitting proper isolation and quarantine.
8. Malarial diseases and typhoid fever.
9. High water carrying off unhealthy matters after it was too late to generate miasms.
10. Scarlet fever.
11. Answered in No. 7.
12. Answered by No. 9.
13. Answered by No. 9.
14. During autumn; rather above average.
16. Probably 150 scarlet fever; five small-pox; sporadic cholera, twenty; diptheria, *true*, ten; typhoid fever, unknown; measles, mild epidemic; whooping-cough, mildly epidemic; cerebro-spinal meningitis, three or four cases; chicken-pox, epidemic, mildly; a few cases of winter cholera up to Dec. 31st.
17. .....
18. Not presumed to be in order of greatest prevalence. Malarial diseases, one; pneumonia, six; scarlet fever, two; dysentery, seven; small-pox, eight; diseases of childhood, three; erysipelas, eight; measles, four; whooping-cough, five; puerperal diseases, nine.
19. .....
20. .....
21. .. ..
22. .....
23. .....
24. Twenty-five to sixty feet.
25. Don't know.
26. June and July.
27. Autumn.

Wishing to say something, I make the supposed approximation timidly; to be sure it is but an approximation. Address J. P. Walton, Muscatine, who will tell you all about everything below No. 20.

W. S. ROBERTSON, M. D.

Muscatine, Muscatine county.

REPLIES OF J. P. WALTON, OF MUSCATINE.

In reply to your Circular No. 23B, I will answer:

20. *January*—Warm and muddy all the month.
February—Warm and muddy all the month.
March — Warm and muddy all the month.
April—First half dry, last half showery.
May—First half dry, last half showery.
June—Wet for nine days after the 14th day; the remainder of the month showery.
July—Dry from the 8th to the 18th; the remainder showery.
August—Dry to the 17th; wet the last half of the month.
September—Dry to the 15th; wet the last half of the month.
October—Dry all the month.
November—Cold and dry; light snow squalls.
December—Cold and dry; light snow squalls.
21. The months of October, November, and December.
22. The months of October, November, and December.
23. January, February, March, June, and half of August.
24. Our city is very uneven; in the valleys, from ten to twenty feet. On the hill from twenty to thirty feet.
25. There is but little difference in winter or summer. The water is held by stratas of hard pan (hard clay). Dry seasons affect the quantity, and not the depth materially.
27-28. Answered by 25.

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*The figures beginning paragraphs refer to Circular 23B, on pages 75-77.

†For counties comprising this division, see page 79 and map.

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I have ventured to send a table showing the different means for thirty years, and the mean for the different months of 1880, which you can compare at a glance. I think the number of days that snow or rain fell the best test to tell the moisture of the ground. Hard rains generally run off without making the ground excessively wet; the light continuous rains wet the most. As excessive cold or hot months have most to do with the health, I have ventured a column on the temperature.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
The average fall of rain and melted snow in inches...	1.52	2.21	2.78	3.79	4.95	4.59	4.66	5.69	4.29	3.65	3.27	2.34	44.27
Rain and melted snow 1880 in inches	3.02	1.63	3.36	3.02	3.25	7.22	3.84	4.46	3.71	.25	.97	1.31	36.44
The average number of rainy or snowy days for 30 years	6	7	8	8	10	8½	8½	7½	8	7	8	7	77
Rainy or snowy days of 1880	10	4	9	7	6	12	7	12	7	4	8	8	94
Wet and dry months of 1880	wet	...	wet	...	...	wet	...	less ½ wet	...	dry	dry	dry	
Mean thermometer for 30 years, degrees	20.9	24.7	31.1	48.7	51.8	66.9	72.3	70.2	62.2	49.2	36.7	23.7	
Mean thermometer for 1880, degrees	35.1	32.0	35.1	48 0	65.1	71.0	76.1	72.0	60.6	48.4	27.4	18.6	

J. P. WALTON.

Muscatine, Muscatine county, April 5, 1881.

REPLIES OF H. M. DEAN, OF MUSCATINE, MUSCATINE COUNTY.

*1. About 8,294.
2. About two hundred.
3. City and township of Muscatine.
4. About the average.
5. About the average.
6. Scarlet fever deaths about seventy, and small-pox deaths none. There had been none of either for some fifteen years or more.
7. Cannot.
8. Malarial fevers were less fatal.
9. We had a very high stage of water in rivers late in the season (should think in July) and afterward dry weather. The high water carried away a great deal of filth.
10. Scarlet fever and small-pox.
11. Cannot.
12. Malarial fever.
13. Same as number nine.
14. Scarlet fever during the fall and winter months; rate was high.
15. Scarlet fever was prevalent the whole of the year. Small-pox was brought here in December, 1880; but on reflection I find that no case of death from small-pox occurred in 1880.
16. Small-pox, two; cholera, there may have been a few sporadic cases; scarlet fever, probably two hundred; typhoid fever, a few; measles, probably fifty; whooping-cough, quite a number; cerebro-spinal meningitis, no very well marked cases; diphtheria, no genuine cases.
17. I do not think there was a case of genuine diphtheria.
18. Cannot.
19. There was no serious disease among animals.
20. Cannot.
21. From January 1st the winter months were dry. The spring months were rainy, but not as much as usual; the remainder of the season was dry. Cannot give the condition of each month. Mr. J. P. Walton keeps a record for the Smithsonian Institute, and doubtless would furnish information of the character required, if requested to do so.

*The figures at the beginning of paragraphs refer to Circular 23B, pages 75–77.

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22. It was unusually dry from July 1st to December 31st; cannot specify more definitely.
23. During no month.
24. Average depth about twelve feet. But during the wet seasons the water is only a few feet from the surface over quite a large portion of the city, and many of the cellars have water in them from one inch to two feet deep.
25. Cannot tell.
26. Do not recollect, if any.
27. October, November and December were lower than usual, but not as low as at some other times.

Very truly yours,

H. M. DEAN, M. D.

Muscatine, Muscatine county, March 24, 1881.

REPLIES OF FRED. H. LITTLE, M. D., OF MUSCATINE.

*1. The population is 8,294.
2. Can't tell positively, as no statistics were kept before June 1st, 1880.
3. The city of Muscatine.
4. The sickness was somewhat less, owing to lessened amount of malaria.
5. The ratio of deaths was about the same, I think, as of previous years.
6. Scarlet fever.
7. Cannot.
8. Malarial fevers.
9. The lessened amount of malarial poison.
10. Scarlet fever.
11. More malignant cases of scarlet fever than usual.
12. Malarial fevers.
13. The fevers were less intense, and the dry hot weather of the summer was favorable.
14. Scarlet fever began about June 1st, 1880, with an unusually high rate of mortality.
15. Scarlet fever about June 1st, 1880.
16. Small-pox, none; cholera, do not know, but I think but few; scarlet fever, June 1st to December 31st, 1880, eighty-one cases; measles, none; whooping-cough, probably not more than five or six cases; cerebro-spinal meningitis, none; diphtheria, none.
17. Small-pox, diphtheria, measles, cerebro-spinal meningitis.
18. Can't do it for want of evidence.
19. No diseases manifested themselves among animals during 1880, except epizootic among horses, which was very light, and there were no fatal cases. It appeared in November.

The questions in regard to meteorology will be answered by another correspondent at this place.

Very respectfully,

F. H. LITTLE, M. D.

Muscatine, Muscatine county.

REPLIES OF G. F. GEISE, M. D., OF MIDDLETOWN, DES MOINES COUNTY.

To give a complete answer to all your questions requires what few practitioners keep, an account. However, I will go over them and see what I can do.

*1. Town not incorporated; population about 116.
2. Five.
3. My practice is principally in Danville, Flint River, and Augusta townships.
4. Rather a greater amount of sickness than usual.
5. Increased by several fold.
6. Chronic diseases principally of long standing in old people.
7. Have no cause.
8. ....
9. .....
10. Chronic consumption, rheumatism.
14. It seemed that all weak were manifested last year.
15. None.
16. Scarlet fever prevailed all the year; a few cases of typhoid; a few cases of measles and diphtheria.
17. Small-pox, cholera. There was small-pox at Burlington, nine miles from here.
21. The summer was dry after about June.
22. August and September.
23. Not at any time.
24. Vary greatly; between ten and thirty feet.
25-26. At no time.
27. August to February, 1881.

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75-77.

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Our butcher, J. P. Wing, has not cleaned his slaughter-house this winter. He is rendering diseased animals, principally hogs, in a tank situated in the township east of this. These animals sometimes lay until they become very rotten. He is extremely careless and filthy. Sometimes after working with these hogs he does not even wash his hands to eat. Butchers with the same instruments that he cuts up hogs with without washing them. Has now a pile of these dead hogs, about 2,000 pounds. cut to pieces ready for the tank, laying uncovered in Middletown. What shall we do? We have been trying to get the trustees of this (Danville) township to organize into a board of health and take care of it, but one of the members, Mr. J. A. Green, is a friend to Wing, so he will do nothing. Wing has, by some means, gained the support of another (Mr. Mathews) which gives *him* the majority and *us* to stand the stink. We reported him to the grand jury, but he had two good friends there who had it all "cut and dried" to work his case through for him, and succeeded.

So here we are, no better off. Last year he had hogs laying out nearly all summer, which came near stinking us out of health and home. The probability is that it will be no better this summer.

I do not know that this belongs to my answer as a correspondent, but thought I would try it as briefly as possible. This is only a fraction of it when all told.

Very truly yours,

GEO. F. GIESE, M. D.

Middletown, Des Moines county, March 28, 1881.

REPLIES OF L. B. POWER, M. D., OF MEDIAPOLIS, DES MOINES COUNTY.

*1. Incorporated town; population, 423.

2. About (4) four.

3. From this point east thirteen miles to Mississippi River; west, north, and south, about six miles.

4. Increase of nearly one-half.

5. Increase of nearly one-half.

6. Phthisis and pneumonia.

There was a marked increase in the prevalence of typhoid fever, typho malarial fever, and typhoid pneumonia on the bottoms, occasioned by the floods of the early summer.

8-9-10. Dropsy in its various forms.

11. None can be given that would satisfactorily account for it.

12. .....

13. .....

14. From February 10th to April 30th there was an unusual fatality attending typhoid pneumonia and the mortality rate was unusually high.

15. During December small-pox prevailed to some extent.

16. Small-pox, three; scarlet fever, probably twenty-five; typhoid fever, five; measles, probably fifty; whooping-cough, probably fifty; diphtheria, probably 100. There was some varicella, but not amounting to an epidemic.

17. Cholera and cerebro-spinal meningitis

18. *January, February, March, and April*—Pneumonia, inflammatory rheumatism, and scarlet fever.

May, June, July, and August—Principally the intermittents and remittents.

Typhoid and typho malarial fever, with some scarlet fever and diptheria.

December—Diphtheria, scarlet fever, measles, and rheumatism.

19. During the fall and entire winter epizootic and distemper largely prevailed.

20. Not having noticed particularly, I do not think generalities of sufficient reliability to record.

21. January, February, March, April, and May were not; the remainder of the year, up to the snow-fall, the last of November, was very dry. Last of November and December unusual snow-fall.

22. June, July, August, September, and October.

23. No unusual moisture of soil.

24. On the prairies about ten feet; near the Mississippi River about twenty-five feet, owing to the descent of the bluffs toward the river-bottom.

25. During the fall months average from three to six feet lower.

26. Not at all.

27. August, September and October.

28. There was, as stated, no peculiar phases of disease, or its increase, except upon the river-bottoms where, owing to the overflow, the destruction of vegetation, and the large amount of animal matter left to decay, together with the

*The figures at the beginning of paragraphs refers to Circular 23B, on pages 75-77.

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vitiated water in the wells which in that locality produced an unusual amount of typhoid and typho-malarial fever, but strangely there was not near the usual amount of intermittent fever during the year.

September, October, and November—

L. B. POWER, M. D.

Mediapolis, Des Moines county, May 1, 1881.

REPLIES OF R. SMITH, M. D., MEDIAPOLIS, DES MOINES COUNTY.

1. Four hundred and twenty-three.
2. Five.
3. For the incorporated town of Mediapolis, Des Moines county, Iowa.
4. I think the amount of sickness greater.
5. Greater; 2 or 3.
6. Typhoid fever, scarlet fever.
7. Do not know of any cause.
8. Diphtheria, cholera infantum, measles.
9. Know of no cause from present recollection; we had an abundance of fever.
10. Deaths were from no prevailing disease.
11. No cause nor unusual mortality.
12. Scarlet fever.
13. To the mildness of its character.
14. No answer.
15. No answer.
17. Scarlet fever, 5 cases, typhoid fever, 3 cases; whooping-cough, 10 cases; cholera, small-pox, measles, cerebro-spinal meningits.
18. *November*—Scarlet fever.
August—Typhoid fever.
November—Whooping-cough, diphtheria.
19. No answer.
20. .....
21. .....
22. .....
23. .....
24 Usual average depth of well not over 12 feet.
25. Did not measure a well.
26. .....
27. September.
28. ....

Respectfully,

R. SMITH, M. D.

Mediapolis, Des Moines county, March 25, 1881.

REPLIES OF A. E. PARKER. M. D., OF KOSSUTH, DES MOINES COUNTY.

1. Yellow springs, 2,094; Huron, 865; Benton, 1,271.
2. .....
3. Towns of Yellow Springs, Huron and Benton.
4. Greater; 50 per cent.
5. Greater.
6. Scarlatina and pneumonia.
7. Location in above towns of eight "new doctors," mostly "irregulars," who generally, at first, pronounced scarlatina "scarlet-rash," and non-contagious. The excess of deaths from pneumonia were from neglect to stimulate, depletion instead of nutrition.
8. Typhoid fever and diphtheria.
9. Unknown.
10. Scarlatina and pneumonia.
11. Already answered; neglect and bad treatment.
12. Typhoid fever and diphtheria.
13. Diphtheria, mild winter; typhoid fever unknown.
14. Scarlatina from September 20, 1879 to April 15, 1880.
15. Nothing new.
16. Cannot tell.
17. Small-pox, cholera, cerebro-spinal meningitis.
18. Have no list.
19. Hog cholera, less than common.
20. Storms of all kinds less in 1st part of year.
21. Whole year dry. The least moisture in 9th, 10th, 11th, 8th, 7th, 6th, 5th, 4th, 3d, 2d, 1st, 12th months.
23. Dry, dry, dry.
24. From 20 feet to 60 feet.
25. In dry months from 5 to 10 feet deeper.
26. Did not note any difference.
27. 7th, 8th, 9th, 10th, 11th, 12th.
28. Can only spare time to number statements in regard to scarlatina, in which the contagion is wholly due to the epithelial designation or, rather the

*The figures beginning each paragraph refer to the questions in Circular 23B, on pages 75-77.

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inhalation thereof. Proof: In 11 families of from 3 to 8 children, there was only one case of scarlatina in each family. In all these, baths and inunction were used throughout. In families where the inunctions were omitted all the children and often the parents were infected.

Yours, etc.

A. E. PARKER, M. D.

Kossuth, Des Moines county, April 29, 1881.

REPLIES FROM C. H. PRESTON, M. D., OF DAVENPORT.

1. Twenty-one thousand eight hundred and twenty-four.
2. Reported by undertaker, 347.
3. City of Davenport.
4. About the same.
5. One thousand five hundred and seventy-seven; average about 16 per 1,000.
6. Scarlet fever and diphtheria.
7. Know of none.
8. Cannot state.
9. Cannot state.
10. Same as No. 6.
11. More than usual prevalence.
12. Cannot state.
13. Cannot state.
14. Greatest mortality from scarlet fever, 11 in June; diphtheria, 7 in September.
15. .....
16. For the first ten months of 1880, scarlet fever, 30; typhoid fever, 5; measles, 2; whooping-cough, 11; diphtheria, 27. No reported record for November and December, the total mortality for which was 66.
17. Small-pox, cholera and cerebro-spinal meningitis.
18. Report except for November and December, furnished by Dr. Cantwell of the local board.

[The report of Dr. Cantwell gives the following:—SECRETARY.]

July—Diphtheria. 1; scarlet fever, 4.
August—Diphtheria, 9; scarlet fever, 27; typhoid fever, 1; whooping-cough, 2.
September—Diphtheria, 7; scarlet fever, 38; typhoid fever, 1.
October—Diphtheria 9; scarlet fever, 9.

19. A very fatal eruptive disease destroyed a large per centage of the domestic cats of the city and county during the summer and autumn.

20. I give a monthly summary of meterological conditions kindly furnished by the Signal Service Observer, Mr. McGauran.

METEOROLOGICAL NOTES, DAVENPORT, IOWA, 1880.

January—Remarkable high temperature. The mean being 17° above the average for January in seven previous years. The highest barometer occurred on the day succeeding the lowest.
February—Temperature, like that of January, above normal. Almost total absence of even great range of barometer.
March—(Very dry up to the 25th. Precipitation less than 0 1 in.). After the 25th copious rains. Remarkably low barometer on the 27th.
April—Very windy. Frequent thunderstorms and violent gales. Local rain-fall in excess
May—Average temperature decidedly higher than recorded for any in the last ten years; greater part of the month dry, but total rain-fall normal.
June—Abnormally large rain-fall, nearly half of which fell in six hours. Temperature above the average for June. River unusually high.
July—Temperature 1 degree below normal. Rain-fall average, but less than in July, 1879.
August—First half of month very dry, last nine days rainy. Temperature and rain-fall above normal.
September—Rain fall in excess. Average temperature nearly 3 degrees higher than in 1879.
October—Very dry after the 3d. Temperature normal, though 2½ degrees lower than in October, 1879; first frost of the season on the 4th; great gale and first snow on the 16th.

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75-77.

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November—Remarkably high barometer and low temperature after the 10th. Deficiency in rain-fall. River closed on the 22d.

December—Temperature below normal. Last half of month remarkably cloudy, there being eight days in succession on which the sun was not seen.

M. McGAURAN, *S. S. Obs.*

Davenport, Scott county.

21. February, March, May, August, October and November for the most part dry; April, June, and September, wet. The soil moisture varied to correspond.

22. Cannot say.

23. Cannot say.

24. About fifteen feet below the bluffs; thirty or forty feet above the bluffs.

25, 26, 27, 28, cannot say.

H. C. PRESTON, M. D.

REPLIES OF L. J. ROGERS, M. D., OF SALEM, HENRY COUNTY.

*1. Number of inhabitants, five hundred and twenty-four.

2. Number four.

3. About three miles square.

4. About an average.

5. The ratio of death very small—probably one-half less.

6. None.

8. Typhoid.

9. Less malaria.

10. None.

11. No report.

12. 13, 14. September much less; much less; water and atmosphere pure.

15. None; small-pox, none; cholera, none; scarlet fever, six; typhoid, about six; measles, quite a number; whooping-cough, none; cerebro-spinal meningitis, none; diphtheria, probably twelve.

17. They are mentioned above.

18. *September*, malarial fever.
February and March, pneumonia.
April, measles.
October and November, typhoid.

19. Epizootic in horses in *April and May* quite extensively.

20. In *January*, no zero; lowest 16° above, highest 56°; four days' rain; snow one-fourth inch 21st. *February*, 4° above; 4th and 29th, 66° above. *March*, highest thermometer 70°, lowest 4°; rain 25th, 26th, 27th and 31st. *April*, highest thermometer 84°, lowest 26°; rain 15th, 16th, 23d, hail 24th. *May* highest thermometer 92°, lowest 30°; rain 16th, 25th, 26th, 27th, 28th, 29th and 30th. *June*, highest 94°, lowest 90°; rain 4th, 5th, 9th, 13th, 14th, 24th, 26th and 27th. *July*, highest 94°, lowest 90°; rain 2d, 8th, 25th and 31st. *August*, highest 100°, lowest 90°; rain 17th, 24th, 25th, 28th and 29th. *September*, highest 90°, lowest 38°; rain 2d, 15th and 19th, frost 13th. *October* 17th, thermometer 20° above; rain 2d, snow 16th and 18th. *November*, highest thermometer 21°, lowest 2° above; rain 2d and 10th, snow 15th, 24th and 29th. *December*, zero 5th, 7th and 8th; highest 14° above.

21. The above will clearly answer the question.

22. October and November.

23. May and June.

24. About sixteen feet.

25. Not having noted these facts, don't know.

26. May and June.

27. October and November.

28. The probable cause of disease, more than any other, is no doubt in the drainage leading to wells. bad water, dirty or filthy cellars, dish and wash water poured out at the door. I had an interesting case. Mrs. O., aged 44, had chronic diarrhœa, and, finally, nearly all the family; then the neighbors, who came to care for the sick. Tracing out the cause, a leak was found in the well near the top of the water, through which came into the well a thick, black, dirty stream, which impregnated the water. I had the well cleaned, and my patients soon recovered. Up to the time of the cleaning, no medicine seemed to avail anything.

Respectfully,

L. J. ROGERS, M. D.

Salem, Henry county, May 2, 1881.

*The figures at the beginning of paragraphs refer to questions in Circular 23B, on pages 75–77.

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NORTHERN DIVISION.*

REPLIES OF C. C. HUCKINS, M. D., OF GREENE, BUTLER COUNTY.

†1. Incorporated town; number of inhabitants seven hundred and eleven.

2. About twenty, not over; under that number, if any different.

3. A radius of six miles, with this town as the center.

4. The amount of sickness was less during the year 1880 than the average for the past six years.

5. The ratio of deaths was perhaps less than that of other years.

6. Malarial diseases were rather more prevalent than usual. No unusual cause of death can be mentioned.

7. Drought is the only cause that I can mention.

8. Contagious diseases were less than usually present.

9. The education of the people in the way of avoiding such: to quarantine and thorough disinfection after cases of such diseases.

10. .....

11. .....

12. Malarial diseases particularly.

13. Probably the type.

14. Moderate epidemic of diphtheria, March and April; mortality probably less than usual.

15. .....

16. Small-pox, none; cholera, none; scarlet fever, none; typhoid fever, not over half dozen; measles, twenty-five or thirty; whooping-cough, a few, not very prevalent; cerebro-spinal meningitis, none; diphtheria, perhaps twelve to fifteen. None other diseases of their nature that I am aware of.

17. Small-pox, cholera, scarlet fever, cerebro-spinal meningitis.

18. *March and April*, diphtheria.
August, typhoid fever.
May, scarlet fever.

19. I cannot specify months. During the fall of 1880, cholera among hogs. In the spring, mild epidemic of pneumonia among horses, not contagious. Chicken cholera at different times during the year.

20. January, light snow-fall; little rain: moderately cold. March and April, cold; rather dry. Summer months, hot and dry. October, November and December, cold, with heavy snow-fall. The year dry throughout, with less than usual thunder-storms. No continued storms. Winds moderate throughout the year.

21. See answer to 20.

22, 23. Cannot state with any correctness.

24. Impossible to give an average, as the depth is uneven; but it varies from fifteen to one hundred and twenty-five; forty-five feet is quite common, one hundred quite rare.

25. Can't answer.

26. Had no unusually high water during the year.

27. From July to September water was unusually low in wells and streams.

28. During the past three years our communities have been very carefully instructed in sanitary and preventive measures and principles, and I think that I can see a marked difference in the number of contagious diseases and the duration of any threatened epidemic of the same. An epidemic of diphtheria in 1878 has borne good fruit in this direction, as that was stamped out after six months' prevalence by a rigid quarantine and by disinfecting measures. I think that I checked another epidemic in March, 1880, by the same means, confining it to the family in which it originated.

In our town the health board take a great deal of pains to enforce the known laws of prevention, to which, in a great measure, I attribute our immunity from zymotic and contagious diseases. We look after cess-pools, privies and all suspected causes of disease, with satisfactory results.

C. C. HUCKINS, M. D.

Greene, Butler county.

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*For counties comprising this division, see page 79 and map.

†The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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REPLIES OF D. M. WICK, M. D., NEW HARTFORD, BUTLER COUNTY.

*1. New Hartford—not incorporated; number of inhabitants for township and town, 975.
2. Six.
3. A section in the northern part of Grundy county, and a section in the southern part of Butler county.
4. About the same as other years, or perhaps owing to the prevalence of diphtheria it was greater.
5. Greater; from 50 to 75 per cent greater.
6. Diphtheria.
Diphtheria, owing to the want of knowledge among the people of its contagious nature, was unusually prevalent.
8. Pneumonia.
9. Mild winter of 1879 and 1880 and pleasant spring months.
10. Diphtheria and its contagious nature.
11. Diphtheria.
12. Pneumonia.
13. Mild winter and spring.
14. October and November; rates low.
16. Scarlet fever, 16 cases; diphtheria, 23; typhoid fever 2.
17. Small-pox; cholera.
18. Diphtheria; January, February, June and July; scarlet fever, November and December.
19. Sore throat and cholera among the hogs in September and October.
20. Cannot give you any different answer; though it was very wet in June and the fall month; windy during spring months; October, November and December were cold months.
21. July, driest; May, August, October and November.
22. July of 8 degrees.
23. September.
24. Fifteen to twenty feet.
25. .....
27. July.
28. The causation or communicability of diphtheria was owing largely to the ignorance among the people as to its contagious nature. A case illustrating: diphtheria broke out in a certain family owing to filthy surroundings. Two children died. Some of the clothing was taken to a distant neighborhood and washed in a family where were children. In less than a week two deaths occurred in this family, and there had been no cases in the neighborhood.

Very respectfully,

D. M. WICK, M. D.

Greene, Butler county, April 29, 1881.

REPLIES OF E. L. THORP, M. D., OF SHELL ROCK, BUTLER COUNTY.

1. Incorporated town of Shell Rock, population, 719.
2. About 25.
3. Six miles square.
4. The same.
5. The same.
6. Diphtheria.
7. No more than epidemic.
8. Continued fever.
9. To steady cold weather.
10. Diphtheria.
11. None.
12. Scarlet fever.
13. Steady cold weather.
14 About an average with other years.
15. None.
16. About 60 cases diphtheria.
17. Have had none of the above.
19. Diphtheria more or less for two years.
19. Hog cholera to large extent.

The remaining questions I am not able to answer.

E. L. THORP, M. D.

Shell Rock, Butler county.

*The numbers at the beginning of paragraphs refer to questions in Circular 23B, pages 75-77.

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REPLIES FROM A. O. STROUT, M. D., OF PARKERSBURG, BUTLER COUNTY.

I forward a record of diphtheria cases in my own practice that was made up two months ago, and I have had a good many cases since. If the Board desires any information not found in that, I will gladly comply with any request they may make.

We have had diphtheria, both in the town and county, continuously for ten months prior to September 18th, and are still having cases.

By way of preface, lest I shall be misunderstood, I will state that all the cases reported in this paper are *genuine diphtheria*. and that no case of follicular pharyngitis or other form of sore throat has been taken into consideration.

During this time, however. I have kept a record of over fifty cases of follicular pharyngitis (and many cases I did not record) where the patient would be confined to the bed from three to five days, with a high fever and a very sore throat, characteristic of that disease, but entirely unlike diphtheria to an experienced observer. I have never seen an epidemic of diphtheria that was not accompanied with an epidemic also of this disease; and, I am sorry to say, many practitioners call these cases diphtheria; some, perhaps, through ignorance, and many, to enhance their reputation.

In the following table I have classified the patients according to their several ages at the time of the attack:—

From one year of age	1 case.
From one to two years of age	2 cases.
From two to three years of age	6 cases.
From three to nine years of age	22 cases.
From nine to twelve years of age	13 cases.
From twelve to fifteen years of age	12 cases.
From fifteen to twenty years of age	9 cases.
From twenty to thirty years of age	4 cases.
From thirty to forty years of age	3 cases.
Total	72

Thus it will be seen that the liability to the disease under one year of age is comparatively nothing; while from one to two years of age it is not materially increased; but from two to three years the susceptibility increases quite fast; and from three to fifteen years it reaches its maximum, and again diminishes, until at forty it has nearly ceased again.

The following table shows the mode of death:—

Croup	0
Blood poisoning	17
Uræmia	5
Œdema of the lungs	1
Embolism	1
Total	24

During this epidemic the croupous form has seldom been seen. The greater portion (nearly 71 per cent) die from blood poisoning.

I have observed that those cases that get well usually commence to improve from about the end of the fifth day of the attack. On the other hand, where they do not recover they usually get worse very rapidly during the latter part of the fifth day, and die from the sixth to the tenth day, but many more on the sixth and seventh than later.

When uræmic symptoms supervene it has usually occurred about the fifteenth day, and after the patient had become convalescent, with the exception of one case, when it came on the twelfth day. I am unable to predetermine what cases will be attacked with this trouble, but have observed in all thus attacked the membrane came off very slowly. But the amount of the membrane or the constitutional disturbance is no index.

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When these uræmic symptoms have arisen, I know of no remedy or combination of remedies that will arrest its progress, as they die in from eighteen to twenty-four hours.

The patient with œdema of the lungs lived thirty-four days from the date of the attack. He had been convalescent over two weeks, and I considered him well, with the exception that he was paralyzed so he could scarcely walk, and could eat and drink with great difficulty. He seemed to be doing finely till twenty-four hours prior to death.

One died from heart-clot while attempting to arise from the bed.

As will be seen from the table giving modes of death, I have lost twenty-four patients out of seventy-two, or 33⅓ per cent. But those figures need some explanation, as they include consultations; and in quite a number of the cases I was not called till the patient was virtually dying.

Exclusive of consultations, and where I was called at the commencement of the disease, I find fifty-eight cases recorded, of which ten died, or 17½ per cent; which therefore represents my actual per cent of loss.

It is a big death rate, but when I look back over these cases I congratulate myself that it is not larger.

A table showing age at time of death:—

Under two years of age	3 cases.
From two to five years of age	2 cases.
From five to nine years of age	4 cases.
From nine to twelve years of age	4 cases.
From twelve to fifteen years of age	7 cases.
From fifteen to twenty years of age	3 cases.
Twenty-two years of age	1 case.
	24

By comparing this with the table showing the number of cases attacked for each year of age, the comparative mortality for each period can be obtained.

Thus, all the cases under two years of age died; while out of twenty-eight cases from two to nine years old only six died; and of thirteen from nine to twelve years old four died. But of twelve cases from twelve to fifteen years old, seven died, or 58⅓ per cent; and nine cases, from fifteen to twenty, lost three cases, or 33⅓ per cent.

Hot or cold weather does not influence the disease in any way, either in its virulence or contagiousness. But I think cold, damp weather, or hot, cloudy weather, makes any given case more malignant. I don't think it affects the spreading of the disease materially.

Respectfully,

A. O. STROUT, M. D.

Parkersburg, Butler county, November 15, 1881.

REPLIES FROM A. A. NOYES, OF MASON CITY, CERRO GORDO COUNTY.

*1. Mason City, inhabitants 2,510; of county, 11,461.

2. In the whole county, ninety-one deaths from all causes.

3. Cerro Gordo county.

4. I think about the same, considering everything.

5. About an average.

6. Diphtheria, and more fatal cases.

7. I cannot assign any cause, unless it be so much south-southeast wind and a damp atmosphere. Astronomers, I believe, contend that the close proximity of the planets has had something to do with diseases and their results. I am ignorant on that point.

8. Nothing in particular.

9. We are on very high ground, and very clear from any malarious infection, having the very best of natural drainage. Our whole county is underlaid with pure white limestone and water as pure as crystal; although I think this water, being so full of lime, is apt to cause trouble with the urinary organs.

10. Diphtheria and perhaps scarlatina.

11. I cannot, more than answer to 7.

*The figures at the beginning of paragraphs refer to questions in Circular 23B, pages 75-77.

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12. We have never had an epidemic of any description; therefore, cannot say as any.

13. High altitude and pure air and water.

14. January and February our fatal cases of diphtheria occurred, fourteen in number. In May the scarlet fever cases occurred, of which two died—and a high rate for this locality.

15. I refer to No. 14.

16. Diphtheria, fifty cases and fourteen deaths; scarlet fever, ten cases and three deaths; typhoid fever, fifteen cases and three deaths; measles, ten cases and no deaths; whooping-cough, none in the past year; cerebro-spinal meningitis, sixteen cases; inflammation of the brain, two cases and two deaths.

17. No small-pox, cholera nor whooping-cough.

18. I refer to January and February for diphtheria with us; and anything tinctured with malaria, including fevers, August, September and October; with lung complications, March, April and May. We have considerable complaint of lung trouble.

19. I believe nothing, except slight epizootic in horses prevailing in September and October.

20. I cannot give anything like a correct statement, as I kept no monthly report or memoranda.

21. I do not know as I understand what is meant by soil moisture. The whole amount of rain-fall during the year was twenty-three inches.

22. The greatest drought was from 15th of July to September 15th.

23. The most and heaviest rainfall was in May and June.

24. In our city, forty to forty-five feet to water. In the country about, the different parts of the county average some sixteen feet to water in wells.

25. Some of these wells go dry in some parts of the season, and at other times in the wet season nearly full.

26. Refer to 23.

27. Refer to 22.

28. Filthy habits, poor ventilation, impure atmosphere, poor drainage or defect in sewerage, the accumulation of filth in streets and alleys, etc.

Although imperfect, so it be.

Respectfully,

A. A. NOYES, M. D.

Mason City, Cerro Gordo county, May 3, 1881.

REPLIES OF C. H. TIDD, OF GENEVA, FRANKLIN COUNTY.

*1. The village of Geneva contains about 150 inhabitants, and the township about 826.

2. Three deaths; one of old age—eighty-three years old; one infant from inanition; and 1 from cordiac hypertrophy, with valvular complications.

3. Geneva township, including the village—part of Osceola township and part of Reeve township, Franklin county.

4. About an average.

5. About 50 per cent less.

6. None.

7. .....

8. We have never had any *single type* of disease since I have been here that has proven fatal, it being a *very healthy* locality.

9 to 15 see 6, 7, and 8.

15. We had nothing unusual; our diseases were pneumonia in mild form, seme bilious remittent and intermittents, summer complaints, etc., among children, but all were easily managed.

16. Scarlet fever, 2 mild cases; typhoid fever, 1 case; ran a mild course; recovered; measles, 4 cases (though there has been 96 cases since January 1, 1881); diphtheria, 2 mild cases.

17. Small-pox, cholera, whooping-cough, cerebro-spinal meningitis.

18. *January*, *February*, and *March*—considerable trouble from pneumonia, although the most cases in any one month were in March.

April, *May*, *June*, and *July*—unusually healthy.

August and *September*—Diarrhœa, some dysentery and a few cases of cholera morbus; 3 or 4 cases in infants almost amounting to cholera infantum.

October—Some intermittents.

November and *December*—Quite healthy.

19. During *November* and *December* hog cholera was prevalent to a slight extent, but not a tithe of what it was in 1879.

Probably 50 hogs will cover the loss (so different farmers inform me).

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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20. January and February unusually free from storms; March, heavy snows, April snow and rain more than usual, May and June unusually pleasant and free from heavy rains. July was the hottest and dryest for that month, we ever had in this locality. August dry. September unusually hot and dry, so much so that farmers had to stop plowing. October warm and dry. November and December very cold; December heavy snow-storms.

21. July, August, September, and October, driest ever was known here; January and February dry for the season; March, heavy snow; April, May, and June had probably the most rain of all, but it was not heavy; November and December dry; no rain; but some snow-storms.

22. July, August, September and October.

23. There were no unusually wet months, it being an unusually dry year.

24. On the north side of the township about 10 feet; about the center of the township, running east and west about 22 feet; south side of township, running east and west about 15 feet.

25. About 12 to 15 feet (this is only an estimate, gleaned from farmers in different parts of the district).

26. Not unusually high at all.

27. In September and December.

28. .....

Respectfully,

C. H. TIDD, M. D.,

Geneva, Franklin county.

REPLIES OF A. M. TUTTLE, M. D., OF BRITT, HANCOCK COUNTY.

*1. Not incorporated; inhabitants 345.

2. Nine.

3. Britt township, Hancock county, Iowa.

4. Increased 5 to 10 per cent.

5. Greater by 15 per cent.

6. Cholera morbus and infantum. So diagnosed

7. Accumulating filth with *very little* drainage.

8. None.

9. .....

10. In general; crowded houses; poor ventilation, and decomposition of vegetable matter, especially the *roots from the upturned prairie the previous year*, and specifically one of Buchanan's bogus diplomas.

11. .....

12. .....

13. .....

14. August and September nearly every case of cholera infantum or morbus, which were probably only severe cases of diarrhœa; one case of erysipelas and death.

15. There were no unusual diseases.

16. There were two cases of scarlet fever. Diagnosis doubtful.

17. Small-pox, cholera, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis, diphtheria.

18. Impossible; only the diarrhœa of August and September.

19. Nothing of the kind happened to the lower animals.

20. Dry in early spring; wet in early part of summer, and *very* dry from August to December, when the snow began to fall.

21. Dryest, November, December, October, September, August, May, April, March, January, February, June, July.

22. November, December, October, September.

23. June, July.

24. Forty feet if dry weather, otherwise 18 to 20.

25. January, 30 feet; February, 30; March, 24; April, 26; May, 28, June, 18; July, 15; August, 24; September, 32; October, 37; November, 40; December, 40.

26. July, June.

27. December, November October, May.

28. I have had two instances occur, showing *very plainly* that it is very dangerous to life and health for one person to *constantly* watch over cases of tubercular consumption. It ought not to be allowed.

I think the English method of sending a *competent* person to investigate the cause of every death from typhoid fever, with power to remove it, a good one.

*The numbers at the beginning of paragraphs refer to questions in Circular 23B, pages 75-77.

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Not having been here but a few months I have encountered considerable difficulty in getting information to enable me even to approximate correct answers.

Hoping what little I may be able to do will profit the Board and further its object, I am, Yours truly,

A. M. TUTTLE, M. D.

Britt, Hancock county, May 3, 1881.

REPLIES BY B. F. BUNCH, M. D., OF LISCOMB, MARSHALL COUNTY.

*1. Incorporated town of Liscomb; population, 452.
2. I would say twelve or fourteen.
3. Marshall county and part of Hardin county.
4. In my opinion, it was less.
5. Take the territory over, about an average.
6. Diphtheria.
7. Cannot assign the cause.
8. Dysentery, typhoid fever.
9. No opinion at present.
10, 11, 12, and 13. No remarks.
14. Probably April and August: low.
15. Cerebro-spinal meningitis, small-pox.
16. A few cases of typhoid, spinal meningitis, measles, and diphtheria; do not know the number.
17. Small-pox, scarlet fever, whooping-cough.
18. Diphtheria mostly in the spring, March and April; dysentery, spinal fever, typhoid fever, August, September.
19. Cannot answer.
20 and 21. No report.
22. I think, in July.
23. September.
24. Probably about thirty feet.
25, 26, 27, and 28. Not prepared to give anything authentic.

B. F. BUNCH, M. D.

Liscomb, Marshall county, April 5, 1881.

REPLIES OF G. A. MEREDITH, M. D., OF AMES, STORY COUNTY.

*1. Ames; Incorporated; 1,153.
2. Four or five.
3. Incorporated town of Ames.
4. About the same.
5. Could not tell positively; will be better prepared to answer for succeeding years.
6. Typhoid fever.
7. Cannot positively; possibly filth.
8. .....
9. Good luck.
10. Typhoid fever.
11. In Ames, one death from typhoid fever (so called) was in a debilitated person, and the history of the case I am unacquainted with. The other—there being only two—was imported.
12. Scarcely any other deaths from infectious or contagious diseases.
13. No hygiene on the part of citizens.
14. .....
15. From August, 1880, to January of present year.
16. Typhoid fever, 2; diphtheria, 1; the other cases were called typhoid fever, but think it doubtful.
17. Measles, scarlatina, cerebro-spinal meningitis, small-pox, cholera.
18. Could not.
19. Cannot tell.
20. Unusually cold during November and December.
21. Have no record by which to answer correctly.
22. .....
23. February, March, and May.
24. Varies greatly; from two to twenty feet. An abundance of water may be found in a locality in from two to ten feet; and in less than a hundred feet from there, you can't find any water until you pass through the blue clay, which is very thick in places.
25. Have no statistics for ascertaining.
26. .....
27. .....
28. I have nothing for 1880, within the incorporated town of Ames.

I am sorry that I cannot answer many of your questions more definitely. Shall be better prepared for 1881.

G. A. MEREDITH, M. D.

Ames, Story county, April 12, 1881.

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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REPLIES FROM H. T. BALDY, M. D., TOLEDO, TAMA COUNTY.

*1. Toledo; incorporated; 1,026.
2. About twenty-five.
3. Toledo city and township.
4. About the average, except greater in old people.
5. About the same as average.
6. Scarlet fever, measles, and diphtheria.
7. Excessive heat, great drought and scarcity of water.
8. Typhoid fever, cerebro-spinal meningitis, whooping-cough.
9. Can assign no particular reason.
10. Scarlet fever, diphtheria, measles, and old age.
11. In certain localities, garbage and filth, acted upon by great heat.
12. Typhoid fever, cerebro-spinal meningitis, whooping-cough, phthisis.
13. Can assign no particular reason.
14. April and May, most scarlet fever and diphtheria; rate low.
15. Cannot answer.
16. Small-pox, none; cholera, none; scarlet fever, 4; typhoid fever, none; measles, 3; whooping-cough, none; cerebro-spinal meningitis, none; diphtheria, 3. Opinion only.

Toledo, Tama county, May 24, 1881.

17. Small-pox, cholera.
18. *April*—Most scarlet fever.
May—Measles.
July, August—Diarrhœa.
19. In September and October cholera prevailed among the hogs in certain localities, and was quite fatal.
20. Wet in April; dry in July and August; in October, hail-storm.
21. April, May, January, February, March, June, July, August, September, November, December, October.
22. In April, dry.
23. In October, moist.
24. Our location is quite undulating; and the depth of earth above ground water varies from fifteen to eighty feet.
25. Cannot do so accurately.
26. April and May the highest. Only opinion.
27. July and August the lowest.
28. Do not know that I can communicate any particular facts or cases; nothing more than the usual causes; viz., filth, poor ventilation, food and raiment, and perhaps particular localities.

All of which is respectfully submitted.

H. T. BALDY, M. D.

REPLIES OF A. W. BERRYMAN, M. D., OF MONTOUR, TAMA COUNTY.

*1. Montour; 457.
2. About six.
3. Montour and Indian Village township.
4. Less. At least ten per cent less.
5. Less. Diminished about forty per cent.
6. Perhaps scarlatina maligna.
7. Scarlatina maligna, for lack of proper care, being most prevalent among Bohemians.
8. Almost all fevers coming from malaria.
9. To our dry seasons.
10. See No. 6, above.
11. I cannot, more than suggested in No. 7.
12. Rubeola and fevers.
13. Less prevalence of these maladies.
14. Scarlatina maligna, high in July.
15. None.

Montour, Tama county, March 31, 1881.

16. Small-pox, none; cholera, none; scarlet fever, about 8; typhoid fever, 3; measles, about 15; whooping-cough, a great many; cerebro-spinal meningitis, none; diphtheria, none.
17. Answered in No. 16.
18. .....
19. None, except horse distemper in December, which became very general.
20. Cannot, having no memorandum.
21. Last season, as a whole, was dry; July and August especially so.
22. Answered in 21.
23. None; having a greater altitude.
24. About 20 feet in town; surrounding country, 30 to 40 feet.
25. Don't vary much.
26. None.
27. In September and October.
28. Nothing special for this report.

A. W. BERRYMAN, M. D.

*The figures at the beginning of paragraphs refer to questions in Circular 23B, on pages 75–77.

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SOUTHERN DIVISION.*

REPLIES FROM C. N. UDELL, M. D., OF CENTERVILLE, APPANOOSE COUNTY.

†1. Incorporated; 2,465.
2. Twenty-five; approximate.
3. The city of Centerville.
4. About an average.
5. About the same; a small decrease from sickness, and a small increase from accident; more coal mines operated.
6. More than usual deaths from pertussis.
7. .....
8. Perhaps malarial.
9. About an equable amount of heat and moisture.
10. None, unless accident and pertussis.
11. Cannot answer.
12. If any, malarial.
13. Milder attacks.
14. Spring months high, balance low.
15. None.
16. Cannot give an opinion. Whooping-cough was quite prevalent, and of severe type.
17. Small-pox, cholera, typhoid fever, cerebro-spinal meningitis.
18. Cannot.
19. Hog cholera, chicken cholera.
20. Was a cyclone in September, not doing much damage.
22. None.
23. None.
24. Twenty feet.
25. Cannot; in September, say ten feet; December, fifteen to eighteen feet.
26. September.
27. December.
28. Have none.

I send almost a worthless report. The only excuse I can offer is, that in common with many others, I commenced practice in this county thirty-two years ago, and neglected to keep a case book, or memorandum of cases, deaths, etc., or any record of epidemics, endemics, etc.; and as we begin we are apt to continue. So now am in the dark.

Very respectfully,

N. UDELL, M. D.

Centerville, Appanoose county, April 21, 1881.

REPLIES OF S. H. SAWYER, M. D., OF UNIONVILLE, APPANOOSE COUNTY.

My practice is mostly a country practice, embracing about six townships in the northeast part of Appanoose county and the northwest part of Davis county, average population of each township about 1,200.

Deaths from all causes in 1880 not quite so numerous as usual, but slightly decreased. Amount of sickness not so great as usual during the year. There was not so much malarial disease or typhoid fever as usual, nor was there any severe epidemic of any character whatever. There was during the winter and spring an unusual amount of chronic gastric catarrh, accompanied in most cases with hepatitis and general depraved condition of the system, marked cachectic condition occurring mostly in elderly males, markedly fatal, and from this most of our deaths have occurred. But for this, there would have been a marked diminution in the number of deaths. The number of deaths from acute diseases of all kinds was less than usual.

During almost every month in the year there was an occasional case of diptheria; mostly mild. No deaths from it.

There occurred during the year about twenty cases of scarlatina; eighteen of typhoid fever; sixty of measles; one hundred of whooping-cough; cerebro-spinal meningitis, four. No cases of small-pox or cholera during the year.

In *January* occurred catarrhal fever, bronchitis, pneumonia, cerebro-spinal meningitis, and croup, two cases each.

In *February*, whooping-cough, bronchitis, pneumonia, rheumatism, and chicken-pox.

*For counties comprising this division, see page 79 and map.

†The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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In *March*, pneumonia, pleuro-pneumonia, bronchitis, whooping-cough, and rheumatism.

In *April*, bronchitis, catarrhal fever, pleuro-pneumonia, influenza, rheumatism, tonsillitis, pharyngitis, diptheria.

In *May*, bronchitis, tonsillitis, measles, whooping-cough, scarlatina, and rheumatism.

In *June*, measles, whooping-cough, rheumatism, bronchitis, and a few cases of malarial fever.

In *July*, intermittent and remittent fevers, cholera infantum, and cholera morbus.

In *August*, same as July, malarial diseases, diarrhœas, and dysentery.

In *September*, about the same as August, with a few cases of typhoid fever.

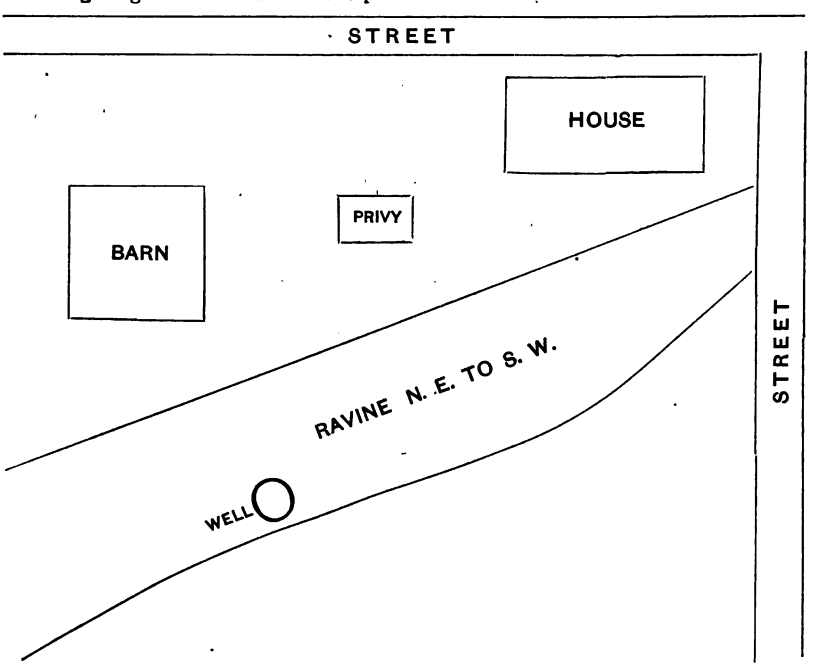
In *October*, the same increase of typhoid and typhus malarial cases, and a few cases of rheumatism.

In *November* and *December* the same, typhoid and malarial fevers, rheumatism, whooping-cough, bronchitis, and pneumonia.

Distemper among horses in summer and early fall; epizootic later, and subsequently, in December, the distemper occurred again, being somewhat fatal with horses which had previously had epizootic; distemper, quite prevalent; epizootic, almost universal. Hogs and chickens suffered from cholera during the spring and also in the fall; disease prevailed quite extensively, but was not attended by usual fatality.

Having no record, I am not able to answer questions in regard to rain-falls, etc. In general terms, we had the first part of April heavy rains; last half of April and all of May unusually dry; June, good average rain-fall; July, August, and first half September, dry. For the balance of the year about ordinary rain-fall; no excessive rain during the year. To question 24 I would say, thirty-six to forty feet, and has varied but very little during the year.

Typhoid fever occurring in one family was attributed to a large cellar under the house filled with vegetables, a box of meat, and garbage generally, submerged in water five feet in depth for three months, with drain into well a short distance away. In a second family four cases of severe typhoid fever occurred. The well, from which all water was used, was nearly one-eighth mile from the house in a ravine. The privy, without a vault, was between the house and the well. The following diagram will illustrate the premises:



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Barn and feed lots on level with the house. Well, 300 feet distant from the barn, one-eighth mile distant from the house, in a ravine; well, thirty feet below the level of the barn, forty feet below the level of the house, and twenty feet deep. Privy, without vault, between the house and well.

Observe that the well is so situated as to receive drainage from the house, privy, and a large part of that from the barn and feed-lot.

S. H. SAWYER, M. D.

Unionville, Appanoose county, Iowa, April 12, 1881.

REPLIES OF L. C. WAILES, M. D., OF CAMDEN, APPANOOSE COUNTY.

*1. Camden is a small village in the west part of Appanoose county, population 51.

2. No deaths during the year 1880 in this village.

3. From the west line of Appanoose county eastward eight miles; four miles south of Camden, and eight miles north.

4. The amount of sickness was greater; how much greater I cannot say; my opinion is fifteen per cent or more.

5. Greater; how much I cannot say.

6. Whooping-cough, catarrhal fever, cholera morbus, cholera infantum, and intermittent fever.

7. Whooping-cough had not made its appearance for several years to any considerable extent previous to 1880; therefore there were more subject to attack than there would have been had it appeared oftener, or annually. The violence of attack was also greater, attributable to being complicated in some cases with catarrhal fever. I know of no real cause why catarrhal fever was more prevalent than usual; it certainly was not caused by damp, cold air, from the fact it made its appearance in July, when the air was both warm and dry. When it first made its appearance it was in a light form, and gradually got worse the remainder of the year. I attribute the unusual prevalence of cholera morbus and cholera infantum to the unusual dry and hot weather in June and July; also to the unusual amount of malaria, as shown by the unusual amount of intermittent fever, the hot weather producing relaxed muscles, impairing the powers of life, and deranging digestion, resulting in irritation, congestion, and in some cases inflammation of the intestinal tube, while the malaria produced congestion of the spleen and liver. The result was an unusual amount of cholera morbus and cholera infantum. I know of no cause why intermittent fever was more prevalent than usual.

8. Other diseases than those enumerated were prevalent about as usual.

9. See answer to No. 8.

10. Whooping-cough, catarrhal fever, cholera infantum.

11. See answer to No. 7.

12. The mortality from other diseases than those above enumerated was about the same as usual See answer to No. 6.

13. Mortality about the same as usual, except as above specified.

14. Whooping-cough made its appearance the first week in March; mortality high; cholera infantum the 15th of June; mortality high; catarrhal fever in July; mortality high; late in season.

15. Scarlet fever in November; a few cases in light form; catarrhal fever in July.

16. Cannot answer all positively; small-pox, none; cholera, none; scarlet fever, a few cases in light form; typhoid fever, a few cases in light form; measles, very little; whooping-cough, very numerous, and very severe; cerebro-spinal meningitis, none; diphtheria, some scattering cases, none malignant; catarrhal fever, numerous cases in severe grade.

17. See answer to 16.

18. See answer to 14 and 15.

19. The epizootic or distemper occurred among horses in February, in a light grade at first; gradually got worse the remainder of the year; killed some horses late in the year. Some of the cattle appeared to be affected in a similar way. The disease called black-leg occurred among cattle in September; did not prevail to any considerable extent.

20. Cannot answer in full.

21. June, October, July, May, January, September, April, November, December, August, February, March.

22. June, July, and October.

23. February and March.

24. Average depth about twenty feet.

25. All wells do not appear to be

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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affected by dry or wet weather to the same extent, though most wells are affected from two to four feet; some still more. Streams when full are about eighty feet below the high prairie. The streams vary between high and low water about fifteen feet. Water in wells and streams very low in June, July, and October.

26. February and March.

27. June, July, and October.

For the better protection of life and health within this State, I would suggest that we urge the passage of a law by our next General Assembly, that will prohibit persons from practicing medicine, surgery, or midwifery within this State unless they are graduates of some respectable medical college, or unless they have been in practice ten years within this State, or have a certificate of worthiness from a board to be created, or the State Board of Health. Some other States have had similar laws for several years, which has caused Iowa to be crowded with inferior practitioners. The evils of this I have witnessed myself. Let the people have protection.

L. C. WAILES, M. D.

Camden, Appanoose county, May 10, 1881.

REPLIES OF R. CUMMINS, M. D. OF MORAVIA, APPANOOSE COUNTY.

*1. Moravia; unincorporated; one hundred and seventy-three inhabitants.

2. Two deaths during the year 1880, in town.

3. The following answers are for a territory three miles from town each and all directions.

4. The amount of sickness was about an average during previous years or, probably, a little less than an average.

5. The average deaths was probably twenty per cent greater than the average for previous amount of sickness.

6. Pulmonary and bronchial diseases or deaths were more prevalent than for previous year's sickness.

7. I cannot do so now.

8. Typhoid fever.

9. I attribute the lessened prevalence of it to the unusually dry season.

10. No greater mortality than usual.

11. I have no cause to assign now.

12. None.

13. None to attribute from this locality.

14. I cannot mention any month as greater than another.

15. None to mention.

16. Small-pox, none; cholera, none; scarlet fever, three; typhoid fever, estimated twenty; measles, five or six; whooping-cough, about twenty-five or thirty; cerebro-spinal meningitis, none; diphtheria, eight or ten, very mild; no others that I now recollect.

17. Small-pox, cholera, cerebro-spinal meningitis.

18. I cannot give a definite answer.

19. In March the cholera with hogs to a very limited extent.

20. Having no notes to found an answer from, I cannot give a correct answer.

21, 22, 23, 24. 25, 26, 27, 28. I have no statistics that will enable me to give anything like a correct answer.

I believe I have no suggestions to make at present. I have had but little time to look up matters relative to the questions heretofore; but will try and do so hereafter.

Respectfully,

R. CUMMINS, M. D.

Moravia, Appanoose county, April 18, 1881.

* The figures at the beginning of paragraphs refer to Circular 23B, pages 75–77.

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REPLIES OF J. M. STURDEVANT, M. D., OF CINCINNATI, APPANOOSE COUNTY.

*1. Incorporated town; number of inhabitants, one hundred and eighty-nine.
2. Three.
3. Town.
4. About an average for the last twenty years.
5. Same as number four.
6. No marked difference from former years.
7. Lack of cleanliness.
8. None designated.
9. None designated.
10. If any difference, I shall say pulmonary consumption.
11, 12, 13. I have not taken any special note.
14. Diphtheria in the country practice March and April; *high rate.*
15. No unusual diseases prevailed.
16. (Opinion) scarlet fever, ten; typhoid fever or typho-miasmatic, twenty; diphtheria, sixty-five.
17. Small-pox, cholera, measles, whooping-cough, cerebro-spinal meningitis.
18. Lung diseases the first four months; diseases of the stomach and bowels the next four months; and typhoid fever and miasmatic fevers the last four months. Diphtheria prevails mostly in damp and changeable weather.
19. Epizootic or malignant distemper with horses the first six months, and hog and chicken cholera the last six months.
20, 21, 22, 23. The year was about an average season with us, and March and April were very wet, while September, October and November dry.
24, 25. Wells are from twenty to sixty feet in this locality; streams shallow.
26. About an average for southern Iowa.
27. .....
28. Surface water that filters through decayed vegetable matter and used as a drink in the spring of the year, unclean wells, dirty cellars, lack of pure air in sleeping-rooms, etc.

Respectfully yours,

J. M. STURDEVANT, M. D.

Cincinnati, Appanoose county, May 28, 1881.

REPLIES OF J. W. YOUNG, M. D., OF BLOOMFIELD, DAVIS COUNTY.

*1. Bloomfield, Davis county; 1,531.
2. About thirty.
3. Bloomfield, Iowa.
4. Less—I would say ten per cent.
5. Less—I would say ten per cent.
6. Malarial diseases.
9. To less rain-fall.
12. Malarial diseases.
13. To less frequent rain-fall and pleasant weather.
14. July and August; less intestinal diseases in children.
15. November, six; a light grade of scarlatina.
16. Small-pox, none; cholera, none; scarlet fever, six; typhoid fever, none, except a typhoid condition as a regular; measles, none; whooping-cough, forty or fifty; cerebro-spinal meningitis, none; diphtheria, a few sporadic cases.
17. Small-pox, cholera, measles, cerebro-spinal meningitis.
18. None, except those common to all parts of upland in Iowa.
19. Hogs have had what farmers called cholera; however, a less number has been lost than usual. No anthrax, no trichinæ.
20. Not prepared. A great wind-storm passed near town in the month of April.
21. No data to draw from, except memory; July, August and September were dryest.
22. None—unusually dry.
23. None—unusually moist.
24. Twenty-seven and one-half feet is claimed.
25. Greater.
27. Lower all the year than common; will say August and September.
28. I believe nothing special can be learned from this town, except that the weather was seasonable at all times of the year. During the warm months our board caused a general cleaning up of the whole town, and I believe it is one of the factors in making good health.

Respectfully,

J. W. YOUNG, M. D.

Bloomfield, Davis county, March 29, 1881.

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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REPLIES OF W. A. TODD, M. D., OF GARDEN GROVE, DECATUR COUNTY.

*1. Incorporated town; number of inhabitants five hundred and forty-nine.
2. Number of deaths five or six.
3. Four miles square.
4. Rather less; perhaps five per cent.
5. About the same.
6. Scarlet fever.
7. Cannot answer.
8. Malarial and typhoid fevers.
9. Most likely the unusally dry weather for several months preceding.
10. None.
11. .....
12. Perhaps no one.
13. .....
14. .....
15. Scarlet fever January, February, March, April and May.
16. Scarlet fever, about thirty; measles, one.
17. Small-pox, cholera, typhoid fever, whooping-cough, cerebro-spinal meningitis, diphtheria.
18. *January*, scarlet fever, pneumonia, ague, neuralgia.
February, scarlet fever, pneumonia, rheumatism, erysipelas, neuralgia, ague, malarial fevers.
March, *April* and *May*, about the same as February.
Each of the summer months about the same, except that scarlet fever was about and had occasional cases of entero-colitis among children.
October, had one cases of measles which was the only one to my knowledge occurring.
In the remaining months there was no marked change in the character of the sickness.
19. Epizootic among horses in March.
20. January, generally warm, air moist, with heavy fogs at times; rain-fall very light. February, March and April much the same. May, warm; more rain than in the previous months. June, much the same as May, except much lighter rain-fall. July and August, warm; much greater rain-fall and more cloudy weather. September cooler, less rain than than in July and August. October and November, cool and generally dry atmosphere. December, cold and dry.
21. June, April, March, January, February, November, December, October, September, July, August.
22. June, October, November.
23. I think, at no time.
24. Thirty-five to forty feet.
25. In the first six months, twenty to thirty feet; water stood at about that in wells; last six months, from two to five feet lower, many wells being dry.
26. At no time.
27. The latter six months.

W. A. TODD, M. D.

Garden Grove, Decatur county, April 12, 1881.

REPLIES OF V. L. CHESTER, M. D., OF GARDEN GROVE, DECATUR COUNTY.

*1. Number of inhabitants, five hundred and forty-nine.
2. Five.
3. The incorporated town of Garden Grove.
4. It was less, one-third to one-half.
5. It was less.
6. None.
7. None.
8. Typhoid fever and intermittent fever.
9. The dryness of atmosphere and evenness of temperature.
10. None.
11. None.
12. For the reasons stated in 8 and 9.
13. To less prevalence of disease.
14. I have no data, but all diseases were attended with low rate.
15. February and March, scarlet fever.
16. Small-pox, none; cholera, none; scarlet fever, four or five; typhoid fever, none; measles, none; whooping-cough, none; cerebro-spinal meningitis, two; diphtheria, none.
17. Refer to 16.
18. *January*—Pneumonia, capillary bronchitis.
February—Scarlet fever, typho-malarial fever.
March—Scarlet fever and pneumonia.
The rest of the season was extremely healthy, and what sickness we had was billious fever, intermittent fever, etc.
19. None.
20. Nothing to report.

*The numbers at the beginning of paragraphs refers to questions in Circular 23B, pages 75-77.

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21. January had 0.10 inches rain-fall.
February " 1.10 inches rain-fall.
March " 1.00 inches rain-fall.
April " 1.25 inches rain-fall.
May " 2.85 inches rain-fall.
June " 1.00 inches rain-fall.
July " 5 95 inches rain-fall.
August " 5.00 inches rain-fall.
September " 3.00 inches rain-fall.
October " 1.80 inches rain-fall.
November " 0.20 inches rain-fall.
December " 0.30 inches rain-fall.
This includes melted snow, hail, sleet, etc. Total rain-fall for season, 23.55 inches.

22. January, November and December.

23. None.

24. Twenty to twenty-five feet.

25. I could give no definite opinion, as I never give attention to the matter in the least.

26. None.

27. None.

28. I have no cases bearing upon the subject.

V. L. CHESTER, M. D.

Garden Grove, Decatur county, March 31, 1881.

REPLIES OF T. ROBERTS, M. D., OF ST. CHARLES, MADISON COUNTY.

*1. St. Charles is incorporated; population, one hundred and eighty-three.

2. No deaths during 1880.

3. Territory having an average radius of five miles, with St. Charles as a center.

4. Average for the year would not differ much from other years.

5. Think it slightly decreased; cause, light mortality among children during the warm months.

6. We were singularly free from endemics during the year.

7. .....

8. Contagions, there being none.

9. Non-infection.

10. No disease assumed special prominence until the closing months of the year, when pneumonitis with various complications, became the most prevalent trouble.

11. There seemed to be a tendency, during the time just referred to, to catarrhal inflammations of mucous membranes, and to pulmonary congestion, but the death rate was inconsiderable.

12. Intermittent (?) phthisis, zymotic diseases, etc.

13. Benignity, or absence of above diseases.

14. None special to report.

15. No unusual disease with us.

16. Small-pox, none; cholera, none—but sporadic (morbus); scarlet fever, some cases of an exanthem about which there was much dispute, some claiming it to be scarlatina and others only a rash; I adopted the latter view, as all cases were light; typhoid fever, probably ten cases within the radius named; (some cases here are denominated the typho-malarial—the latter feature showing itself decidedly, while enteritis and other typhoid symptoms are unmistakably present; measles, none during 1880, but prevailing now; whooping-cough, none, I think—it passed through the vicinity two or three years before; cerebro-spinal meningitis, no cases to my knowledge—it was endemic here some eight years ago; diphtheria: that is a hard one; to accept the reports and opinions passed among the people and some physicians, we would have to say it prevailed; seriously, I do not think a case of true diphtheria occurred within the radius mentioned; aptha and simple ulcerated sore throat both prevailed, and were often called diphtheria.

17. Given sufficiently above.

18. To give that would have required the keeping a daily register of diseases treated, whereas in keeping our accounts in this section, the financial aspect of account-keeping has seemed to be all we have aimed to keep strict account of.

The midsummer and early fall months are those in which the most sickness generally occurs with us, and proceeds mostly from derangements of the digestive system, weakened by the heated term, and overloaded from the great plenty of vegetable products to be obtained at that time.

19. Mostly what is known as cholera, and prevailed among fowls and hogs. The extent was almost complete on some farms, and slight on others; the time, from midsummer to near the close of the year.

20. Kept no record, but I remember the usual hot season was more frequently relieved by showers than usual.

21. Kept no record of this, either, though I remember generally that the alternation of moist and dry was so

*The figures at the beginning of paragraphs refer to Circular 23B ,on pages 75-77.

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regular as to render it an excellent year for crops.

22. No statement but foregoing.

23. No statement but foregoing.

24. Average depth to water in wells, fourteen feet.

25. Spring and fall months, five to six feet; midsummer and midwinter months, eighteen to twenty.

26–27. For causes previously stated, the season was at no time unusually dry or wet.

28. We recognize in this (a part of the "Three River country"—South, Middle and North rivers—) the prevailing causation of disease as malaria, and find in it either the "grand mal," or an element of it the great majority of cases of sickness with us. The question of communicability involves many considerations: earth, air, water, food, etc. The germ theory, now on the tapis, supposes that all these agencies may communicate infection.

I can only answer many of the inquiries approximately, but have given them as nearly correct as I can.

Yours truly, etc., T. ROBERTS, M. D.

St. Charles, Madison county, March 25, 1881.

REPLIES OF H. C. HUNTSMAN, OF OSKALOOSA, MAHASKA COUNTY.

*1. Population, 4,598; incorporated.

2. One hundred, estimated.

3. City of Oskaloosa.

4. Greater; increased 25 per cent.

5. Increased 25 per cent (estimated).

6. Scarlatina.

7. Epidemic.

8. Miasmatic fevers.

9. Cool, seasonable summer months.

10. Scarlatina, anginose, and consumption among old people.

11. Scarlet fever.

12. Fevers, misasmatic.

13. Mildness of the type; favorableness of the season conducive to such fevers.

14. January, February, March, April, November, December, high; May, June, July, October, low; August and September, medium.

15. January, February, March, April, scarlet fever; September, October and November, diphtheria, typhoid fever.

16. Small-pox, none; cholera, none; scarlet fever, 300; cases (estimated): measles, 6 cases; whooping-cough, 25 cases; cerebro-spinal meningitis, none; diphtheria, 25.

17. See question 16.

18. During the first four months, 250 cases of scarlet fever; during the last four months, 25 cases of diphtheria.

19. Don't know; animals mostly healthy, so far as I am informed.

20. 1880 was marked, first by an unusually warm winter and late spring, winter being open; spongy most of the season, with very little snow and considerable rain-fall. Of the former there was only .28 of an inch when melted, while of the latter there was, during the first quarter, 2.65 fall. Much of this time there was thawing and freezing, alternately, with fogs and evaporations. The second quarter was characterized by light but frequent showers, a cool, fresh temperature. The third quarter by heavy thunder-storms and abundance of rain, less frequent, while the fourth quarter was shaded off from light rains to heavy, wet snows.

21, 23. Oskaloosa is situated on a plateau of ground seven miles south of the Des Moines River, and four miles north of the Skunk, and drained by shallow ravines, the principal ones are given off from the northeast and southwest. Into the one to the northeast is drained all that portion of the city lying in that direction from the square, including the night soil, etc., from the principal hotel, Donwing House and within one block from the square this drain is open. A fact worthy of note is that for the past ten years diphtheria has originated in the vicinity of the drain annually, and from this quarter spread to other parts of the city.

The water in the wells is fifteen to twenty-five feet from the surface. The soil is black sand loam, with clay subsoil.

H. C. HUNTSMAN, M. D.

Oskaloosa, Mahaska Co., August 29, 1881.

*The figures beginning each paragraph refer to questions in Circular 23B, on pages 75–77.

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REPLIES FROM C. N. UDELL, M. D., OF BLAKESBURG, WAPELLO COUNTY.

My replies of necessity will be very indefinite and unsatisfactory to myself, but after consulting with Dr. Berry (my only competitor here), and by reference to my case-book, also bringing into requisition my memory, I will report as best I can.

*1. Unincorporated town of 198 inhabitants.

2. Two.

3. Adams and Polk townships in Wapello county, and Urbana and Mantua townships in Monroe county, embracing about 2,500 inhabitants.

4. Diminished; probably near one-half.

5. About the same as the average; quite a number of old persons died during the year from chronic affections.

6. The various catarrhal affections and measles; cause of death, tuberculous consumption.

7. The winter of '79 and '80 being unusually open and wet.

8. Miasmatic diseases.

9. Not sufficient soil moisture during and just preceding the heated term. We had a long heated term, including much of June, July, August and September, yet during this time we did not have sufficient rain-fall to overflow the low lands. Neither did we have the usual southwest winds; two prominent factors in the production of malarial poison. In this locality miasmatic diseases, and the prevailing winds from the south-west hold the relation of cause and effect, or else they are almost universally coincident.

11. My opinion is advanced under No. 7.

12. The prevalence or non-prevalence of malarial diseases does not appear to to materially affect the death-rate, as these affections are generally amenable to treatment. The mortality was about average.

14. From January to April measles prevailed to a considerable extent, with rather an unusually low rate of mortality, only one aged person dying (from consumption) within this territory.

16. Typhoid fever, 8; measles, 200; whooping-cough. 60; diphtheria, 9; (measles and whooping-cough guessed at.)

17. Small-pox, cholera, scarlet fever, cerebro spinal meningetis.

18. *January*— Catarrhal affections, bronchitis, tonsillitis, pleuritis, pneumonia, rheumatism, croup, neuralgia, erysipilas.

February—Same as January, with a few sporadic cases of diphtheria.

March—Bronchitis, intermitting and remitting fever, tonsillitis, croup, erysipilas.

April—Remitting and intermitting fever, bronchitis, neuralgia, diarrhœa, pneumonia, miasmatic fever. I think those persons who were attacked with miasmatic fever carried the fever over from the preceding year, and the wet, open winter and spring was only an exciting cause.

May—Billious fever, tonsillitis, bronchitis, diarrhœa, rheumatism, neuralgia.

June—Bilious attacks, cholera morbus, diarrhœa, neuralgia.

July—Remitting fever, cholera morbus, diarrhœa, cholera infantum, and urinary troubles.

August—Remitting fever, diarrhœa, cholera morbus, cholera infantum, urinary troubles, neuralgia.

September—Remitting and intermitting fever, diarrhœa, cholera morbus, cholera infantum, neuralgia.

October—Colitis, diarrhœa, throat affections, bronchial.

November—Same as October; a few cases of erysipelas, etc.

December—Bronchitis, pneumonia, remitting fever, rheumatism, erysipelas, urinary troubles.

19. During February, March and December, 1880, the epizootic or influenza prevailed to a considerable extent among horses, but of rather a mild type. In September and October hog cholera was somewhat prevalent in the north and west of this territory. We cannot attribute this outbreak to any local cause. This disease appears to have been imported from Missouri by an extensive stock merchant. Chicken cholera has infested some localities, but I am unable to discover that the disease was confined to any particular locality or season of the year.

20. Having kept no meteorological tables or register my reply will be rather indefinite.

January and February were unusually warm and wet. The summer heated term was rather unusually long, embrac-

* The figures at the beginning of paragraphs refer to Circular 23B, pages 75-77.

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ing most of June, July, August and September—that is, continuously warm, while the thermometer did not register any unusually hot days. During this time, we had occasional showers, though most of the time a clear, blue sky (a persistent yellow sky portends ague). July was the dryest month; January wettest; July the hottest month; December the coldest. Cold weather came on in October, earlier than usual. October, November and December were dry.

21. All I can say is embraced under No. 20.

22. In July and December.

23. January, February.

24. West half of Adams township, about twelve feet; east half of Adams township, about thirty feet; Polk township, thirty-five; Mantua and Urbana, about twenty feet, average.

25. Cannot estimate with any certainty. The rise and fall in wells and streams correspond to the surface moisture.

26. January.

27. July.

28. The diseases most prevalent in this section of country are those produced by miasma; such as intermitting and remittant fevers, congestive or pernicious fevers, periodic neuralgia, dysentery, tyhpo-malarial fever, etc. The requisite amount of heat and moisture, to cause the decay of a large amount of vegetation, is sure to be followed by the above named diseases, and the prevailing winds are from the southwest. Illustration: In the summer of 1878, we had our May and June freshets, the rainfall being sufficient to overflow the low lands. July was dry and hot; prevailing winds from the southwest. Nearly every family living on the north or northeast of any swamp or marshy district suffered from some form of malarial fever. Those living at the head of ravines even a mile from the marsh were affected, while those on the west and north of such marshes were not attacked, unless there were other marshes south or west of them. Some time near the last of August the wind changed and for a few days blew from the northeast and east, and, as a result, many were attacked with ague (in eight to ten days), in localities before exempt; namely, on the south and west of the swamps. Many of those who escaped the sickness at this time, had chills and fever the following spring.

Such observations, however, of course, are not new, but only help to confirm statements from others, years ago. The only preventive means seems to lie in the thorough drainage of the whole country.

The matter of devising means for the prevention of this class of diseases is of far greater importance than many physicians seem willing to admit. While comparatively but few deaths are reported as resulting directly from malarial poison, I feel well assured in my own mind that the *remote* cause of *very many* deaths is this subtle poison. Many reported as having died from dysentery, cholera infantum, some hepatic trouble, brain lesion, and even consumption and heart disease doubtless were the sequelæ of a malarial fever, or at least were developed by the presence of miasma or under the debilitating influence of it.

Respectfully submitted,

C. N. UDELL, M. D.

Blakesburg, Wapello county, April 11, 1881.

REPLIES OF THOMAS W. BAUGH, OF CARLISLE, WARREN COUNTY.

*1. Four hundred and fifty.

2. Four.

3. Allen township, Warren county, and Allen, Polk county.

4. Less; diminished one-third.

5. Less; diminished one-third.

6. Diphtheria.

7. Know of none.

8. All forms.

9. Do not know.

10. None.

11. Know of none.

12. All forms.

13. Do not know.

14. All forms were below the average.

15. Were none.

16. Typhoid fever, 3; diphtheria, 20.

17. Small-pox, cholera, scarlet fever, measles, whooping-cough, cerebro-spinal meningitis.

18. *March*—Diphtheria.
April—Diphtheria, 12.
November—Typhoid fever, 3.

19. Hog cholera prevailed to a limited extent during April and May, also October and November.

20. Quite hot during July and August.

21. Moist during February, March,

* The figures at the beginning of paragraphs refer to Circular 23B, on pages 75-77.

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April, May, September, and October; dry in June, July, August, November, and December.
22. July and August.
23. Not in any.
24. From 12 to 18 feet in wells; 25 to 50 in streams.
25. July and August, 18 to 25.
26. Not in any.
27. July and August.
28. Can give none.

Respectfully,

THOS. W. BAUGH, M. D.

Carlisle, Warren county, April 14, 1881.

REPLIES OF F. W. FLOWER, M. D., OF ALLERTON, WAYNE COUNTY.

1. Allerton is incorporated and contains a population of 888.
2. About 20.
3. Allerton and immediate vicinity.
4. About the same.
5. About the same.
6. Diphtheria.
7. Can not.
8. Can not state.
10. Diphtheria.
15. October and November, diphtheria.
16. Ten or twelves cases of diphtheria. There were a few cases of typhoid fever. 5 or 6.
17. Small-pox, cholera, scarlet fever, measles, whooping-cough, cerebro-spinal meningitis.
19. Never less hog cholera during the winter months.
24. About 25 feet.

Yours truly,

F. W. FLOWER, M. D.

Allerton, Wayne county, April 2, 1881.

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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NORTHWESTERN DIVISION.*

REPLIES OF J. L. SUTHERLAND, M. D., OF NEWELL, BUENA VISTA COUNTY.

†1. Three hundred and sixty.

2. Three.

3. The eastern quarter of Buena Vista, the western quarter of Pocahontas and a small strip of the northeastern part of Sac county.

4. From what I can ascertain it was less *about* 2 per cent.

5. About the same.

6. Entero-colitis among infants and typho-malaria among adults.

7. Unusual drouth which, on account of swamps and basins in this locality, more decaying vegetation was exposed to the direct rays of the sun, with the usual results, and the water in the wells being quite low and lying in a strata of clay peculiar to the region, rendered very unfit for drinking and culinary uses.

8. Cannot say.

9. .....

10. I can say nothing more than is said in answer to 6 and 7.

14. From July 15th to September 1st, and only *comparatively* high.

15. As this is a newly settled country I don't think there was any new disease.

16. Small-pox, 0; cholera, 0; scarlet fever, 0; by pleuritic fever, 0; measles, *about* 12; whooping-cough, perhaps 30; cerebro-spinal meningitis, 0; dyphtheria, 0; entero-colitis seemed to be endemic; catarrhal laryngitis prevailed in vicinities, the former in the greater degree. Of the latter I don't know of a single fatal case.

17. Answered in 16.

18. *January* — Pneumonia, measles, and bronchitis, with a few mild cases of throat affections.

February—Principally the same, only in an intense degree.

March—A few cases of pleuritis with an unusual amount of renal congestion; don't know the cause, unless produced by malarial influence.

April—Erysipelas of the mild forms and but few cases.

May—Hepatic derangements with the usual complications.

June—But little sickness of any kind.

July—First part healthful, but toward the last cholera-morbus among adults; entero-colitis among children.

August—About the same as last of July.

September—About the same as preceding, but with diseases abating gradually.

October—Remittent and typho-malarial fevers, with increased mortality among adults, cause stated above.

November — Generally healthful; no cases of importance.

December — Very healthful; evidently from a steady, low temperature and a dry atmosphere.

19. Hog cholera, and among horses a recurrence of the epizootic, the former in July and August, the latter in November mostly; both in a mild degree.

20. Nothing unusual, except excessive high winds continuing several days in succession, and one severe hail-storm in July.

21. From June, 1879, to April 1880, there was but little rain-fall in this vicinity. The said moisture as follows: June. May, August, September, January, February, March, November, December, October, April, July.

22. June, May.

23. July, April, and the latter part of September, and first of October.

24. Ten to twenty-five feet in wells; streams, five to seven feet; variation is slight.

25. Couldn't say.

26. July.

27. June.

28. As before stated, this being a new country, there are not the conveniences here. Houses small; using same room for kitchen and sleeping apartments, there is necessarily great variations of temperature, uncleanliness of both body and domiciliary; too many occupying the same apartment, etc. These and many other kindred *causes*. As to communicability, that there is not sufficient opportunity for isolating the sick is a *very* prominent feature. By *enforced*

*For counties comprising this division see page 79 and map.

†Figures preceding paragraphs refer to Circular 23B, on pages 75-77.

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regulation of these last named items, there is no question but the sanitary condition would be greatly improved. Excuse the brevity of this, and next year I can furnish you with a more exact report as I shall collect and record facts.

J. L. SUTHERLAND, M. D.

Newell, Buena Vista county, April 18, 1881.

REPLIES OF THERON NICHOLS, OF FT. DODGE, WEBSTER COUNTY.

*1. Population, 3,580.
2. In the city, 35; in the country, 108.
3. City of Fort Dodge.
4. Rather diminished.
5. Less.
6. No disease was more than usually prevalent.
7. .....
8. No one can be particularized. It was a season of general health.
9. Lessened rain-fall and dryness of atmosphere in consequence.
10. None.
11. .....
12. None can be particularized.
13. .....
14. None.
15. None worthy of mention.
16. Typho-malarial fever, two; diphtheria, one; whooping-cough, one.
17. Small-pox, cholera, scarlet fever, measles, cerebro-spinal meningitis.
18. There was no epidemic diseases during the year; the mortality seems to have been quite freely distributed through the year.
19. The only prevailing disease was what is known as "hog cholera," which prevailed almost continually from about June till the close of the year. This was very fatal and prevailed in neighborhoods throughout this county (Webster), usually sweeping away from one-half to nearly the whole of each herd in which it broke out. The pecuniary loss to our farmers was very great.
20. The most noticeable feature was extreme dryness. There were but light rain-falls in the spring, and but two or three storms during the summer. Not enough rain fell before frost came to perceptibly raise the water in springs or wells. Probably not more than six or eight inches fell during the entire season.
21. The whole season was uniformly dry.
22. The whole season was dryer than 1879, which itself was usually dry. The season of 1878 was accompanied by *more* than the usual rain-fall.
23. ....
24. On the river-bottom (Des Moines River) three to ten feet; on the second level (sand and gravel subsoil) twenty to fifty feet; on the highest level (prairie surface) clay subsoil, ten to twenty feet.
25. The depth gradually increased with advance of season.
26. .....
27. All.
28. There is nothing to communicate of importance on account of general healthfulness of the season; as you are aware returns from physicians date from about July 1, 1880, and estimates are made on first six months of year.

Respectfully submitted.

T. NICHOLS, M. D.

Fort Dodge, Webster county, March 29, 1881.

*Figures preceding paragraphs refer to Circular 23B, on pages 75-77.

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WESTERN DIVISION.†

REPLIES OF A. V. BENEDICT, M. D., OF DENISON, CRAWFORD COUNTY.

*1. Of the incorporated town, 1,441.
2. Cannot say; unusually few.
3. An average of seven or eight miles each way from Denison.
4. *Much* less.
5. *Much* less.
6. None.
8. Diphtheria.
9. Do not know, unless a general cleaning up of yards and alleys.
16. Can learn of *no* cases of small-pox. cholera, cerebro-spinal meningitis; *very* little typhoid, if any; no measles; perhaps a few cases of diphtheria, and in the fall and early winter some whooping-cough.
17. Cannot say positive. See 16.
19. Some epizootic among the horses; cannot learn how much or at what time most prevalent.
21. *Very* dry all the season.
24. From twelve to fifty feet, as it is very rolling ground.

The answers to the questions are not as full as I wish, but I have been here only one month and have gathered my information by inquiry. Many of the questions I could not answer at all. Awaiting further communication, I remain,

Truly yours,

A. V. BENEDICT, M. D.

Denison, Crawford county, April 1, 1881.

REPLIES J. M. RENDLEMAN, M. D., OF EXIRA, AUDUBON COUNTY.

*1. Incorporated; population in July last. 604.
2. About twenty.
3. A radius of ten miles.
4. Very nearly the same.
5. Same as No. 4.
6. None.
7–8–9. Answered in No. 16.
10. None.
11. .....
12. Answered in No. 16.
13. .....
14. Rates of mortality about average.
15. No unusual diseases occurred.
16. There were about thirty cases each of whooping-cough and typho-malarial fever of average violence.
17. Small-pox, scarlet fever, cholera, measles, cerebro-spinal meningitis, diphtheria.
18. Averaged about the same during the year.
19. None.
20. January, February, and March, mild winter weather; not a great amount of snow or storms. April noted for unusual continued high winds. May, June, July and August, unusually dry and extremely hot part of the time. September and October, ordinarily cold. November and December, cold.
21. Don't know exactly. The summer months *unusually* dry—should say August and September the dryest.
22. August and September.
23. Neither.
24. Ten to sixty feet. The country is quite rolling; average thirty feet.
25. Can't tell.
26–27. Hard to tell; governed very much by rain-fall on high grounds, but on low ground not so preceptable.
28. Not prepared to answer.

Respectfully,

J. M. RENDLEMAN.

Exira, Audubon county, March 28, 1881.

†For counties comprising this division, see page 79 and map.

*The figures at the beginning of paragraphs refer to Circular 23B, pages 75–77.

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REPLIES OF W. S. SCHERMERHORN, M. D., OF JEFFERSON, GREENE COUNTY.

*1. Jefferson; incorporated; 1,444.
2. Twenty.
3. Jefferson, Hardin township, one-half Bristol township, Jackson township, one-half Greenbrier township, one-half Franklin township, Grant township and Highland township, all in Greene county, Iowa.
4. Diminished about five per cent.
5. Diminished about ten per cent.
6. None.
7. ....
8. Malarial diseases and enteric.
9. Dryness of the season.
10. None.
11. .....
12. Enteric, particularly.
13. The extreme dryness of season.
14. In January, high rate of mortality; throughout the rest of the year, low.
15. In September and October a number of cases of diphtheria, which is a very rare disease with us.
16. Measles, perhaps 50; whooping-cough, two hundred; diphtheria, twenty; no others.
17. Small-pox, cholera, scarlet fever, typhoid fever, cerebro-spinal meningitis.
18. *January*—Erysipelas, enteritis.
February—Pneumonia.
March—Pneumonia.
April to September—No disease prominent.
September—Diphtheria and measles.
October—Measles and diphtheria.
November and December—No disease prominent.
19. September to December, a disease among hogs popularly called cholera; less of it, however, than usual.
20. Unable to do it satisfactorily.
21. September, August, October, June, July, March, February, May, April, January, November, December.
22. Every month in the year.
23. None.
24. Fifteen to twenty-five feet; pretty uniform in the entire district.
25. Cannot give particulars; the variation was perhaps five feet.
26. None.
27. All the year, but especially in March and September.
28. I have some facts on this subject which I shall be pleased to submit at an early day.

W. S. SCHERMERHORN, M. D.

Jefferson, Greene county, April 5, 1881.

REPLIES OF W. R. LEWIS, M. D., OF RIPPEY, GREENE COUNTY.

*1. Rippey; unincorporated; one hundred and ninety-two.
2. .....
3. The territory consists of Union township of Boone county, and Washington township of Greene county; there are probably 1,500 inhabitants in the territory.
4. Probably less by twenty-five per cent.
6. None.
7. .....
8. Measles, diphtheria, whooping-cough, diarrhœa of children, dysentery, remittent and intermittent fevers.
9. To the absence of extremes of heat and cold, and the absence of special causes.
10. None.
11. .....
12. From all.
13. To the mildness of the diseases.
14. No disease attended by a high rate. In December there occurred an epidemic of influenza, but was attended by a very low rate of mortality, no deaths occurring.
15. December, influenza.
16. Small-pox, none; cholera, none; scarlet fever, none; typhoid fever, one; measles, none; whooping-cough, none; cerebro-spinal meningitis, none; diphtheria, none.
17. Small-pox, scarlet fever, cholera, measles, whooping-cough, cerebro-spinal meningitis and diphtheria.
18. Cannot ascertain.
19. There occurred in March and April some cases of "strangles"; also, cases of inflammation of the bowels and colic among horses during the summer.
Typho-malarial fever prevailed to considerable extent during the months of November and December.
There were a few cases of lung fever. There are a few cases of farcy among horses.
Among cattle there were a few deaths

*Figures at the beginning of paragraphs refer to Circular 23B, on pages 75-77.

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after they had been turned into the stock fields.

The only constant lesion, post-mortem, was a congested condition of the brain.

Some cases of cholera among hogs.

20. No records kept by anyone.

21. August, July, September, October, November, June, May, April, December, March, January, February.

22. September, August, July, October.

23. Not unusually moist.

24. Probably an average of ten feet.

25. Below the average from July during the remainder of the year.

26. Not unusually high during the year.

27. July, August, September, October, November and December.

28. A child who was said by the attending physician to have scarlet rash, and was devoid of danger, was allowed to leave home in the desquamative stage, and was allowed to mingle with its cousins, five of whom were seized on the eighth day with the initial symptoms of scarlatina, in all of whom it was of severe form, followed by renal troubles (dropsy, etc.,) in four, and ear trouble in one, which shows that a mild case may communicate a severe form of the disease.

I am indebted to Drs. Mower and Lovejoy, and J. B. Hall, V. S., for the foregoing information. Respectfully,

W. R. LEWIS, M. D.

Rippey, Greene county, August 20, 1881.

REPLIES OF S. J. PATTERSON, M. D., OF DUNLAP, HARRISON COUNTY.

*1. One thousand, two hundred and sixty-four.

2. Fifteen or twenty.

3. Confined to Dunlap.

4. Slightly less than an average.

5. Same as No. 4.

6. None.

7. .....

8. Diphtheria has been less prevalent than for four years.

9. Cannot give any at present.

10. None.

11. .....

12. Same as No. 8.

13. .....

14. Had no particular epidemic.

15. Nothing new.

16. Cannot give the number of cases, but they have been very few.

17. Small-pox, cholera, cerebro-spinal meningitis.

18. Cannot give them.

19. The epizootic.

20. Cannot give an account by months, and cannot think of anything unusual except drouths. Had no rain of consequence during the year, and no snow in the early part of the year.

21. Refer to No. 20.

22. March, April and May.

23. See No. 20.

24. The wells are from thirty-five to sixty feet deep according to location in hollow or on hill.

25, 26, 28. The streams were all very low and some dry that were never known to be so before. They were probably lowest during September, October and August.

S. J. PATTERSON, M. D.

Dunlap, Harrison county.

REPLIES OF A. E. STEVENS, M. D., OF WALL LAKE, SAC COUNTY.

*1. Unincorporated; two hundred and eight.

2. The mortality was very small, there being but four deaths.

3. Sac and surrounding counties.

4. About the same.

5. About the same as previous.

6. Cholera infantum.

7. Prolonged hot weather caused that.

8 Diphtheria; and, in fact, all were less prevalent except the one named.

9. .....

10. From cholera infantum.

11. In all of the cases of death from that disease there was a peculiar heat or inflammation at the base of the brain.

12. Diphtheria and scarlet fever.

13. There were but very few cases.

14. From July 25th to October 15th.

*The figures at the beginning of paragraphs refer to questions in Circular 23B, pages 75-77.

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15. There was nothing unusual during the year.

16. Scarlet fever, one; whooping-cough, two; diphtheria, several; of the rest, not any appeared.

17. Small-pox, cholera, typhoid fever, cerebro-spinal meningitis.

18. Cholera infantum from July to October; the others were scattered all through that time.

19. Nothing but hog-cholera in the spring and summer.

20. Nothing unusual, except dryness.

21. They were about alike all through.

22. April, May and August.

23. There was no unusual moisture here at any time during the year.

24. About forty feet is the average.

25. There are no facts to note, only a gradual decrease of water all the year; old wells were made deeper, or new ones dug.

26. There is no comparison to be made.

27. June, July, August, September, October and November.

28. As for this, there are no facts to be stated. This question will be answered in different ways, but certain it is that persons seem to make a business of scattering carcasses of hogs that have died of cholera, especially in the vicinity of farms where there are known to be large droves of hogs. These persons are renderers of lard, or soap-makers, etc. People should be compelled to bury out of sight the carcasses of all animals that may die on their premises. For example: the Boyer River no doubt washed hundreds of dead bodies down to the Missouri River with the spring freshet which had been thrown into it to get rid of them. You can readily see the evil that may result from this to the warmer countries south of here. It should be prohibited by law.

Yours, with respect,

A. E. STEVENS, M. D.

Wall Lake, Sac county, April 14, 1881.

REPLIES OF ALLEN A. RAWSON, M. D., OF CORNING, ADAMS COUNTY.

*1. Incorporated town; population, June, 1880, 1,522, adding one mile in vicinity about total, 1,675.

2. Ten.

3. Town and one mile in vicinity. See No. 1.

4. The average (opinion).

5. Same as No. 4.

6. None.

7. See No. 18 below.

8. Infantile diseases slightly less.

9. Generally even temperature and moderate rain-fall.

10. None.

11. None.

12. See No. 8.

13. See No. 9.

14. No date—did not exist. See No. 4.

15. None but ordinary diseases, except as in No. 16.

16. Two cases scarlet fever in March—one case typhoid fever in August, and few scattering cases of pertussis.

17. Only as in No. 16.

18. December—influenza, acute catarrh, coryza.

19. Hog cholera, moderate extent; epizootic or distemper in horses; extensive but in average mild form in December.

20. January, February, March mild, quite moist; April and May, high, warm winds with vast clouds of dust and removal of earth, often making drifts from one to four feet deep; June, July, August, dry with light showers, except as in No. 23; September cool with frequent rain (see No. 23); October, dry and cold with warm sunshine; November, dry, opening cold, becoming very cold and freezing from 10th, increasing to 30th, and ground frozen solid for rest of year; December, cold, loaded with moisture and fog with scarcely sunshine.

21. See No. 20; soil corresponded with weather.

22. April, May and June.

23. Last half of August and first half of September.

24. Twenty-five feet; no great variation.

25. Varies from fourteen feet in spring months to thirty feet in September.

26. No obvious difference.

27. From January to middle of August.

28. See No. 18; ceased promptly upon recurrence of dry, cold weather.

* The figures at the beginning of paragraphs refer to Circular 23B, on pages 75-77.

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Few cases of typhoid fever and diphtheria said to exist in Adams county at large, but in general the foregoing answers fairly for the county doing 1880.

I am respectfully,

ALLEN A. RAWSON, M. D.

Corning, Adams county, March 29, 1881.

REPLIES OF E. E. MAJOR, M. D., OF ANITA, CASS COUNTY.

*1. Five hundred.
2. About thirty.
3. A radius of about four miles, *i. e.*, a distance in all directions from Anita of four miles.
4. About the same as the average, though less than in 1878 and 1879, owing to epidemics of diphtheria in those years.
5. Same as for No. 4.
6. None.
7-8-9-10-11-12-13-14. None.
15. None.
16. Small-pox, none; cholera, none; scarlet fever, typhoid fever and measles, a limited number of cases of each disease; whooping-cough, quite prevalent in latter months of 1880, and continuing to date March, 1881; cerebro-spinal meningitis, none; diphtheria, a few light cases.
17. Small-pox, cholera, cerebro-spinal meningitis.
18. .....
19. Have heard of no prevalent diseases among animals save occasional outbreaks of "cholera" among swine, mostly in the spring and fall.
20. No characters of weather noted.
24. Unusual depth to water in wells, twenty feet to thirty-five feet.

I have found myself unable to answer satisfactorily to myself a large number of your questions, and thought best to leave them blank.

Hoping to be able to answer in better and more positive manner your succeeding lists, and trusting this may not be wholly without value. I am,

Yours very truly,

E. E. MAJOR, M. D.

Anita, Cass county, March 25, 1881.

REPLIES OF L. M. ANDREWS, M. D., OF LEWIS, CASS COUNTY.

*1. Population, four hundred and seventy-nine.
2. Only three deaths from all causes during the year.
3. The territory with which I am most conversant is Cass township; south part of Washington and Atlantic; west part of Bear Grove; northwest part of Noble, and north part of Pleasant townships, all in Cass county; also, the east part of Wright township, in Pottawattamie county, embracing a territory of ten or twelve miles.
4. Disease has been on an average with other years.
5. About the same as the average.
6. Diphtheria.
7. Cannot say positively, but as near as I can ascertain, the above was caused from drinking unhealthy water, and some from extreme uncleanliness. One family had two cases of diphtheria, one fatal. Everything was in perfect order, but they lived on a newly-broken piece of land. I could not attribute any cause for the trouble. I was confined to this locality.
8. .....
9. .....
10. .....
11. I cannot, except what is stated above.
12. .....
13. ....
14. .....
15. .....
16. Cannot give the exact number of cases. Scarlet fever complicated with diphtheria, ten to fifteen, all in one locality; typhoid fever, only three cases; measles, sixteen or seventeen cases; diphtheria, uncomplicated, seven.
17. Small-pox, cholera, whooping-cough, cerebro-spinal meningitis.
18. November and December the most prevalent was diphtheria, and, also, in July and August; measles in March and April.
19. No disease appeared among the animals last year.
20. No meteorological phenomena occurred that I can recollect, but a cyclone, very destructive to animals and property, which occurred on the evening of

*The figures beginning each paragraph refer to questions in Circular 23B, on pages 75-77.

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June 8th, coming from southwest and going northeast.

21. There was but little difference as to moisture during the year.

22. If there was any difference, it was the dryest in August.

23. No month. All were dryer than previous years.

24. From fifteen to seventy feet.

The last few questions I cannot answer. In spring months the ground water would be nearer the surface, as a general rule, than later in the season; but the year 1880 was an exception to all previous years, as the ground water was farther from the surface during the whole year.

Yours respectfully,

L. M. ANDREWS, M. D.

Lewis, Cass county, April 15, 1881.

REPLIES OF T. D. ROOD, M. D., OF ANITA, CASS COUNTY.

*1. Incorporated. Population, four hundred and seventy-nine.

2. Seven.

3. Anita and vicinity, a radius of six to ten miles.

4. Less, I should judge, by thirty-three and one-third per cent.

5. About the same.

6. Diphtheria more than average, but not so great as in 1879.

7. Perhaps the lingering influence of the epidemic of diphtheria prevailing late in the year 1879.

8. .....

9. .....

10. .....

11. .....

12. .....

13. .....

14. April, May and June, diphtheria, high; May and Jue, scarlatina, low.

15. July, August and September. influenza, rheumatism and typho-bilious fever.

16. Scarlet fever, twelve; typhoid (bilious), twenty-five; diphtheria, twenty or thirty; measles, 1 (estimated).

17. Small-pox, cholera, whooping-cough, cerebro-spinal meningitis.

18. *July, August, September and October*—Typho-bilious fever.
April, May and June—Diphtheria.
May and June—Scarlet fever.

19. Cholera among hogs from August to December. Epizootic, or influenza, among horses in December.

20. .....

21. May, June, July, August and December, wet; September, October and November, wet.

22. May, June, July.

23. September, October, November.

24. On rolling prairie, twenty-five to thirty-five feet; on bottom land, twenty to twenty-five feet.

25. Difficult to answer. During July and August many wells were dry throughout the country, but the largest creeks all had running water.

26. Cannot say that it was at any time.

27. May, June, July and August.

28. Diphtheria started in one family (Germans) where the house was built over a hole dug in the ground, and used as a cellar, with no drainage from it, or ventilation under the house. Water had stood in the cellar, and as the dry weather came on, settled away into the ground. The trap door being raised, used for the purpose of entering the cellar, created a terrible smell of badness.

The form of typhoid fever mentioned above, mostly occurred within the corporation, and was no doubt caused by exposed privies, and many of them in close proximity to the wells from which water is used for drinking purposes.

Suggestions, though of doubtful practicability: Compel every person to see that cleanliness exists in both front and back yards of premises; that no water from the top of the ground enters directly into a well used for drinking purposes; that no privy in town be built or used without cemented vault, and the same be thoroughly cleaned at least twice a year; that the manure from all stables be removed at least every two weeks in the summer time; that henhouses be kept clean; that cellars be looked after in town and country; that vegetables be not stowed away in house cellars for winter keeping. I believe much sickness can be prevented by cleanliness, good ventilation, pure water, etc.

Yours truly,

T. D. ROOD, M. D.

Anita, Cass county, March 30, 1881.

* The figures at the beginning of paragraphs refer to Circular 23B, pages 75-77.

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REPLIES OF R. R. HANLEY, OF SIDNEY, FREMONT COUNTY.

*1. Sidney; incorporated town; population 855; the civil township contains 2,994.

2, 3. The mortality was unusually small, not over one per cent in town and township.

4. One-third less than average.

5. The ratio of deaths less by 50 per cent.

8. Intermittent fevers, remittent, typhoid and dysentery were less than usually prevalent.

9. Less, on account of copious rains in the hot months, causing less deleterious exhalations.

10. Not any.

11. Same as No. 10.

12. From those named above.

13. Equable temperature.

14. Diphtheria, scarlet fever, cholera infantum.

15. Epizootic of animals in the month of December.

18. There was very small prevalence of any one disease above others occurring in this township.

19. Epizootic in the early winter.

20. The rain-fall of January, February, March and April was very light, and the weather mild and pleasant. The hot months, up even to frost, had plenty of rain, and a thrifty and long growth of vegetation; November and December were winter months of steady and moderately severe cold weather.

21. The soil moisture in this locality I can give no better than by the rain-fall. The months in order of dryness to wetness are February, January, March, April, November, December, June, July, August, October, September, May.

22. The dryness was greatest the first four months; the wettest the next four months.

24. Our land is much of it rough, rolling prairie and timber land; and much of it flat bottom-lands of the Missouri and Nishnabotna rivers. The uplands vary in depth to water from 50 to 90 feet; on the bottoms from 15 to 35 feet.

25. The variation is but small in this region; I can not state definite.

26, 27. Water was low, the first four months; highest the succeeding eight months.

28. To improve health conditions, I regard the regulations of the State Board as of the first value in respect to cess-pool, privy and stock yard drainage; next the ventilation and temperature of school rooms and churches, lecture-rooms, etc. I would commend to your favor the proper encouragement of training schools for nurses and the more extended and correct ideas of hygiene in the treatment of incipient disease. I would be glad to give you more exact information, but I have given you the best I can for the present time.

Respectfully,

R. R. HANLEY, M. D.

Sidney, Fremont county, April 19, 1881.

REPLIES OF O. W. ARCHIBALD, M. D., OF IOWA ASYLUM FOR FEEBLE MINDED CHILDREN, AT GLENWOOD, MILLS COUNTY.

*1. City of Glenwood, 1,791.

2. About 10.

3. Town of Glenwood for 1,800 people.

4. Diminished about 10 per cent.

5. Less 10 per cent.

6. Typho-malarial fever, meningitis, and perhaps mild cases of diphtheria.

7. Cannot; unless the unusual dryness of the season and low water indicates.

8. Cholera infantum and dysentery in children.

9. Don't know; excepting climate seemed more even and nights not so cold.

10. Typho-malarial fever and three cases of diphtheria.

11. The nervous system of patients with fevers seemed to be greatly poisoned and protracted at the beginning of the disease; caused undoubtedly from the unusual severity of the malarial poison or the impurity of water or effects of ice, sewerage and ventilation of apartments, etc.

12. Answered in No. 8.

*The figures at the beginning of paragraphs refer to Circular 23B on pages 75-77.

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13. See No. 9.
14. High in September and November.
15. Diphtheria in September October, and November.
16. Typhoid fever, 6; diphtheria, 12; meningitis, 5.
17. Small-pox, cholera, scarlet fever, measles, whooping-cough, cerebro-spinal meningitis.
18. Typho-malarial fever, diphtheria, cholera infantum.
19. In October several horses died from epizootic or a similar disorder, and many were diseased during October and November.
20. .....
21. March, April. June, September, October, November, July, August, February January, December, May.
22. April, May, June, and September.
23. August and July.
24. Varies from 8 to 150 feet. The great difference depends upon the high prairies adjoining the low bottoms of the Missouri, and other creeks in the neighborhood.
25. It would vary from 3 to 12 feet.
26. July.
27. September and October.

I have answered the questions as near correct as possible from my own observation, and what I can obtain from the other physicians in the town. The year 1880 has been unusual in regard to the nature of diseases in this particular locality. There have been less cases of sickness and fewer deaths. But all cases seemed to be of a more severe type and lingered longer than is common. It has seemed to me for a long time that a great deal of sickness in our smaller towns originates from the carelessness of people in regard to out-houses. I presume our town is no exception, and I am sure that two-thirds of the privies are filled level with the surface of the ground and during both the rainy season and the excessive hot days of July and August the influences of this nuisance must be anything but healthful to the inhabitants. But for fear you think me suggesting an evil that to my mind ought to be overcome in every locality, and with which you are perfectly familiar, I will close. I only wish I could be of some service to your honorable body and to the people generally in this important matter.

Very respectfully,

O. W. ARCHIBALD, M. D.

Glenwood, Mills county, May 5, 1881.

REPLIES OF F. M. POWELL, M. D., OF HASTINGS, MILLS COUNTY.

The following is a report from memory for the year 1880:

*1. Incorporated town; number of inhabitants four huudred and fifty.
2. Six.
3. Town of Hastings, eight to ten miles north and south on the bottoms of West Nishnabotna River; east and west two to three miles along the uplands.
4. A little less than usual.
5. The ratio of deaths a little less than previous.
6. .....
7. .....
8. Malarial and summer complaints were less than usual.
9. There was not the amount of moisture in the bottoms; the ponds and morasses were dry throughout the season.
10. .....
11. .....
12. Malarial and summer complaints.
13. To the moderate amount of moisture in the atmosphere and even temperature of the season.
14. .....
15. .....
16. I have no record; had no cases of small-pox or cholera; of scarlet fever, a few cases of a mild type; typhoid fever, probably a dozen cases during the year, including typho-malaria; measles, but few cases; about twenty cases of diphtheria; one sporadic case of cerebro-spinal meningitis.
17. Small-pox and cholera.
18. *January* and *February*—Catarrhal lung fever.
July and *August*—Summer complaint.
August and *September*—Malarial fevers.
19. .....
20. .....

*The figures at the beginning of paragraphs refer to Circular 23B, on pages 75–77.

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21. Have no record.
22. .....
23. .....
24. Bottom-lands sixteen to twenty-five feet.
25, 26, 27, 28. Cannot answer.

We promise you a fuller report for the year 1881.

Yours truly,

F. M. POWELL, M. D.

Hastings, Mills county, May 28, 1881.

REPLIES OF C. DEETKIN, M. D., OF COUNCIL BLUFFS, POTTAWATTAMIE COUNTY.

*1. Eighteen thousand and fifty-nine.
2. No record; about four hundred.
3. Council Bluffs, Iowa; four miles square, about.
4. About the same.
5. Average.
6. Diphtheria.
7. Cannot assign any cause.
8. None.
9. .....
10. No unusual mortality, diphtheria excepted.
11. Cannot answer.
12. Average mortality.
13. .....
14. Diphtheria, and especially diphtheretic croup, come on always with a raw, cold spell of weather.
16. No small-pox; no cholera; twenty-five scarlet fever; fifty typhoid fever; fifty measles; no whooping-cough; no cerebro-spinal meningitis; two hundred diphtheria (opinion); and many (hundreds) malarial diseases.
17. Small-pox, cholera, cerebro-spinal meningitis.
18. *July* and *August*—Diarrhœal diseases.
September—Malarial diseases.
November—Typhoid fever.
December, January, February, March—Diphtheria.
19. A disease among hogs, called hog cholera; as far as I can understand, something like a typhoid fever; and another disease commencing with swelling of throat and a peculiar paralysis of the limbs, similar to diphtheria.
20. Dry up to May.
21. April very dry.
22. March, April and part of May.
23. None.
24. Eighteen to twenty-two feet in Missouri bottom.
25. .....
26. None.
27. Spring.
28. .....

I am in the habit to smoke my own house from cellar up, monthly, with sulphur, and also every house wherever I find typhoid fever, or especially diphtheria, and have reason to think it prevents spreading of the above mentioned diseases distinctly.

C. DEETKIN, M. D.

Council Bluffs, Pottawattamie county, March 26, 1881.

*The numbers at the beginning of paragraphs refer to questions in Circular 23B, pages 75-77.

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REPLIES OF THOMAS B. LACEY, M. D., OF COUNCIL BLUFFS, POTTAWATTAMIE COUNTY.

*1. Eighteen thousand and fifty-nine.
2. City and county about 300; city 225.
3. Council Bluffs and Pottawattamie when so specified.
4 About the same average as with previous years; certainly no increased per cent.
5. Same answer as to question 4.
6. None; we had no epidemic of any kind.
7. .....
8. There is no data upon which to base a definite reply. In my opinion there was no disease or cause of death perceptibly less prevalent except "found dead," and unknown causes.
9. Morals, and law, and order.
10. I should judge that there was no increased mortality in proportion to the population.
11. None.
12. None.
13. .....
14. Am unable to answer.
15. None.
16. In city and county as per answer to question No. 3. Deaths only: Scarlet fever two; typhoid fever, about fifteen; measles, two, if my memory serves me right; whooping-cough, four or five in infants; cerebro-spinal meningitis, one, I think; diphtheria, twelve or thirteen, as reported between August 1, 1880, and January 1, 1881; am unable to give whole number of cases.
17. Small-pox and cholera, and no case of cerebro-spinal meningitis in city corporation.
18. Am unable to answer this question.
19. In September, October, and November several cases of epizootic among horses, and in the summer chicken cholera among poultry.
20. Cannot answer.
21. I should say from my own observation, August, September, July, October, June, and November were the driest in the order mentioned, and that January, February, March. April, May, and December would average about alike, with May, perhaps, a little dryer than the others.
22 During the months mentioned as the driest in answer to the 21st question.
23. I believe none.
24. Fifteen to eighteen feet; you will bear in mind that the principal part of our city is located on the bottom-land. Water can be reached in some localities at a depth of eight to twelve feet; but fifteen to eighteen feet will be the average for wells.
25. Have made no observations upon which to base an opinion even.
26. March, April, May, and December.
27. June, July, August, September, and October.
28. During the year two cases of sudden death in children were reported to our local medical society by Dr. H. W. Hart, which from the symptoms he was of the opinion they were cases of stramonium poisoning, the poison believed to have been conveyed through the milk of cows having eaten the stramonium while grazing. Both cases were in the same family, and both died within three or four hours of each other, and neither of them living more than twenty-four hours after showing first symptoms. There was no *post-mortem* or other examination, so that there was nothing absolute in regard to the case. Dr. Donelan of Glenwood reported having personal experience with similar trouble in his own family, and he believed from a similar source—no deaths, however.

Yours respectfully,

THOS. B. LACEY, M. D.

Council Bluffs, Pottawattamie county, April 17, 1881.

*The figures at the beginning of paragraphs refer to questions in Circular 23B, on pages 75–77.

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LEGISLATIVE RECOMMENDATIONS.

Practical experience has demonstrated that chapter 151, laws of 1880, is very defective, and requires an important amendment to accomplish the intent of the framers of the law, and the object of the State Board.

The returns received at this office from the clerks of the district and Circuit Courts, give abundant evidence that physicians and those who solemnize marriages, neglect to observe the laws in making returns of their doings to the clerk as required by section five. For such violation, the clerk is authorized to bring an action for the recovery of the penalty provided, but he must do so at his own cost. Inasmuch as the fines and penalties recovered go into the county treasury, the county becomes the beneficiary of the recovery. This section should be so amended as to require the county or district attorney to prosecute without delay, to a final hearing, in the name of the State, on complaint of the clerk of the courts, all actions, under this section.

The value of vital statistics is in their completeness.

It is a common, I may say prevalent, impression, that vital statistics are of but little use, except to physicians and insurance companies. It seems strange that the eminently practical American mind which is so largely moved by pecuniary motives, does not readily discover the great importance of a full collection of the very few particulars of the three great events in human life—birth, marriage, and death.

The advantages to be derived from a registration of vital statistics may be briefly enumerated; to-wit,

1. Furnishing a reliable record of facts, which are frequently necessary in establishing right to, and the distribution of property.

2. Aiding in the detection of crime.

3. Determining the social condition of the people, and the influences which control the gradations in society.

4. In ascertaining the sickness and mortality, with reference to causes, and comparative prevalence in localities; and in furnishing the means to discover the influences which conduce to the prevalence, as well as the means of controlling them. Prevention is easier than cure. The arguments are unlimited which might be adduced to show

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that the people of Iowa are interested in wealth, as well as health, in the full and complete execution of the law relating to vital statistics; and that clergymen, physicians, midwives, coroners, and all others who have duties under the law to perform, shall fully comply therewith.

Considerable controversy has arisen in various cities and towns, as to the proper construction of section thirteen. Whether or not the mayor and entire council of a city and town were necessary to constitute the board of health of such city or town, or whether or not a portion of the council may constitute such board? The statutes of Iowa nowhere recognize such an officer as "alderman." I would suggest that the word "council" be substituted in line one, section thirteen, for the word "aldermen," and that after the word "shall," in the third line, the words "*shall constitute the board of health, and shall*" be inserted.

Section fourteen requires the appointment of a physician as health officer. No definite time is fixed for such appointment, and the returns from clerks and health physicians indicate that the requirement is largely neglected. I would suggest that this section be amended by inserting after the word "appoint," in the first line, the words, "*and constantly have,*" and insert after the word "jurisdiction," in the third line, the words, "*and an executive officer of the board.*" There is an imperative necessity for this provision in order that regulations restricting contagious diseases by local boards may be enforced by a proper person. At the end of the section add the following:

"*Within thirty days after the annual meeting of the trustees, in each year, the board of health shall meet for the transaction of business, and shall appoint, or re-appoint a health physician, and the clerk of the board shall immediately transmit to the Secretary of the State Board of Health, at Des Moines, the name and post-office address of such health officer. A special meeting of the board may be called by the order of the president, or of any two members of the board.*"

Under section fifteen, health physicians and clerks of local boards are required to return to this office, all cases of contagious or infectious diseases occurring within their jurisdiction. A very important provision is entirely omitted from the law. It is not made the duty of any person to furnish the facts upon which these reports can be made. The State Board sought to remedy the defect by adopting the following rules, which were printed in the circulars on small-pox, diphtheria, and scarlet fever. (See pages 28, 32, 36).

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Whenever any *householder* shall know that any person within his family is taken sick with the small-pox, scarlet fever, diphtheria, *or any other disease dangerous to the public health*, he shall immediately *give notice thereof to the board of health*, or to the *health officer* of the township (city or town) in which he resides; and if he shall refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars.

Whenever any *physician* shall know that any person whom he is called to visit is infected with the small-pox, scarlet fever, diphtheria, *or any other disease dangerous to the public health*, such physician shall immediately *give notice* thereof to the board of health or health officer of the township (city or town) in which such diseased person may be; and every physician who shall refuse or neglect to give such notice, shall forfeit, for each offense, a sum not less than fifty nor more than one hundred dollars.

In order that the guardians of the public health may have early warning of the presence of contagious or infectious diseases, it is important that prompt notice be given thereof.

Nine-tenths of the reports from clerks of local boards, and that where contagious diseases are known to have been prevalent, come to this office inscribed, "no cases of contagious diseases reported to me," evidencing clearly that physicians and householders take cover under the omission of statutory provision to defeat a very important object of the State Board of Health. These requirements should be engrafted on the statute, and the penalty made ample to insure obedience. The safety of a community from the ravages of an epidemic disease depends upon the prompt application of restrictive measures. The physician and householder are the first to be apprised of the presence of a contagious disease, hence, it should be made their duty to act promptly for the protection of the community. From the hazard, and the risk to human life involved, a violation of these requirements should be made a misdemeanor.

Under the provisions of section five, all physicians and midwives in this State are required to register their names with the clerk of the District and Circuit Courts of the county where they reside. No penalty is attached for neglect to do so, hence, I am informed by clerks of the courts that this requirement is largely ignored by physicians and midwives. A full compliance with this statute would afford the clerks some means of determining whether or not physicians and midwives made returns of births and deaths occurring under their supervision. As the statute now is, it is only necessary to abstain from registration to secure exemption from operation of the law.

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During the past year a question of considerable importance arose in several counties, among physicians and clerks of the courts. Where a physician practices in one or more counties, and he is registered only in the county where he resides, the question arises whether or not he should make return of births and deaths coming under his supervision to the clerk of the county wherein he resides, or to the clerk of the county wherein the fact occurred. The object and intent of the law is to secure vital statistics for each county in the State. The presumption is, that the returns should be made to the clerk of the county wherein the birth or death occurred. The question was referred to the Attorney-general in 1880, and again to his successor in January, 1881. Their opinions were directly contradictory. In view of this evident ambiguity of the statute, some modification should be made to cure the defect.

The Secretary of the State Board of Health is required by section eleven to submit to the Governor, on or before December 1st of each year preceding the meeting of the General Assembly, a biennial report. Under section 1, chapter 159, laws of 1876, the executive department requires a duplicate copy of this report to be filed in the office of the Governor, on or before November 1st. Under section 24, chapter 151, laws of 1880, clerks of local boards are not required to report to the State Board until November 15; and under section three, clerks of the District and Circuit Courts are required to report October 1st. The necessary delay in transmission, and frequent neglect of clerks, renders it impossible for the Secretary of the State Board to compile a report at the date fixed by the provision of chapter 159, laws of 1876. These discrepancies and conflicts should be harmonized, and the fiscal year for reports of clerks of the courts and clerks of local boards should close at the same date.

No provision is made in chapter 151, laws of 1880, nor in the Code of 1873, for compensation of members of a board of health of an incorporated city or town. While section 505, of the Code, provides compensation for members of the council of a city or town, acting for the city or town in its corporate capacity, it is doubtful if this section would apply to members of a board of health, created under a different statute, and whose acts and services are not those of the municipal corporation of which they are the officers, *per se.* They are entirely distinct from those of a council. The doctrine laid down by the Supreme Court in *Larkin Upton v. County of Clinton,* 52 Iowa,

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311, would preclude such local boards from compensation under the provisions of section 505, the court holding that the right to compensation by an officer, exists only by virtue of express statutes.

There is but one penalty provided in chapter 151, laws or 1880, which would come within the criminal law. All others are forfeitures, recoverable only by civil action. Much complaint has been made to this office of the inadequacy of the law in this regard to secure compliance with the rules and orders made by local boards. Ill favored and irresponsible persons disobey and set at naught such rules with perfect indifference, as a money judgment in court against them is valueless. To meet this objection, which practical experience has proved a serious one, it would seem advisable that section 419, of the Code, be revived, and chapter 151 be harmonized therewith.

During the past year notice was given this office, and the same was observed by newspapers in different localities, that agents were going about the State offering for sale to millers formulas for a compound to change the appearance of low grade flour so as to give it the character of a higher and better grade. The adulteration of food is practiced to an alarming extent, and extreme measures should be provided to protect the lives and health of the people therefrom. Section 4036 of the Code of 1873, should be so amended as to punish the sale, or offering for sale, any formula for, or any mixture or compound to adulterate food.

Glanders among horses has made its apperance extensively over the State, and in view of its communicability to man, and its almost absolute fatality, more extended legislation is necessary to give local boards of health power to restrict it, and dispose of diseased animals. The present statutes are inadequate to that end. Attention is directed to a special paper on that subject in another part of this report.

The statute now gives the State Board of Health only directory, or advisory power. Practical experience has demonstrated the necessity for giving the rules and orders of the State Board mandatory power, with statutory force and effect.

Contingencies have arisen, and will arise, where local influences prevent the operation of the health laws for the protection of the people. Authority should rest somewhere in such cases, to secure to communities the full benefit of the law, and nowhere could it be vested with more impartial judgment than with the State Board of Health, composed, as it is, of representatives from different parts of the State.

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One of the most important subjects which come within the jurisdiction of boards of health is that of nuisances. These boards are now authorized to make such regulations respecting nuisances, within the limits of their jurisdiction, as they may deem necessary for the preservation of public health. They may order the same abated, but it must first be conclusively shown that they are nuisances in fact, and this can only be, as I understand the statute, by a court of competent jurisdiction. Slaughter-houses are considered by the courts as *prima facie* nuisances, and so of many other kinds of business, trade, and manufactures, yet a person engaged in them cannot be compelled to discontinue that business upon the judgment of any tribunal other than that of a court. Provision should be made whereby the carrying on of any business or trade which is injurious to the public health may be prohibited or restrained by boards of health. The parties so prohibited or restrained should have the right of appeal from orders of prohibition made by such boards, to a court of competent jurisdiction, where the question may be determined by a jury. Pending the appeal, the orders of the board should be in full force and effect.

Provision should also be made whereby, in every incorporated city or town or township, written consent or permission shall first be obtained of the mayor and council, or the trustees of a township, to erect, occupy, or use any building or premises for the purpose of carrying on therein the business of slaughtering animals, or for melting or rendering fat, lard, or other substance, or for any obnoxious trade or occupation whatsoever. And the neglect to obtain such consent or permit should make such person liable to a fine for each day such premises or building are used without a permit. The State Board of health should be granted authority, if in their judgment the public health or comfort, and convenience require it, to order any person, or persons, or corporation carrying on such trades or occupations, to desist or cease from carrying on such business or occupation, after being so ordered by the State Board of Health, under a penalty for refusal to obey such order: *provided,* that on any application for said Board to exercise the powers granted, a time and place should be assigned by the Board for a full hearing of the case; and no order should be issued by the Board until such hearing is had. Nothing therein should conflict with the powers granted to local boards, or with powers of courts to issue injunctions.

The statute recognizes the office of health physician of a local board of health, but he has no executive power. It seems to be imperative

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that the medical and sanitary officer of a board of health be given power to enter upon and inspect premises where the existence of a nuisance is suspected.

If courts were always in session, so that the question of a nuisance could be speedily determined, the case would be different, but they are not. Emergencies often exist requiring prompt and immediate action to protect the public health. Boards of health should therefore have the power to restrain persons from maintaining a nuisance until a hearing can be had before a court. Such is the law in Massachusetts, and the Supreme Court of that State has confirmed the action of boards of health under the statute granting such powers.

The great danger to which the state of Iowa is now exposed from the introduction of *pleuro-pneumonia* among cattle, and the consequent pecuniary loss, as well as the influence upon the health of consumers of meat, suggest that rigid and restrictive measures be adopted. To this end the statutes of Massachusetts are probably the most effective of any in force in the United States. It is verily a pestilence which *walketh in darkness*. It is well known the improvement of our native herds of cattle is made largely with animals taken from Eastern herds. One animal from an infected district, or infected in a stock-yard, or railroad car, may be brought to this State and mingle with a native herd for a month before the infection in the imported animal is even suspected. Once rooted upon the stock ranges of the West the result would be disastrous. It is a danger which threatens all classes alike, the stock owner and the consumer.

Section three requires that clerks of the District and Circuit Courts shall keep a record of all births, marriages, and deaths, and report the same to the State Board of Health on the 1st day of October in each year, and at such other times as the Board may require. This is the imposition of a new and often laborious duty upon clerks, for which no compensation is allowed. It is but justice and equity that some compensation be fixed by statute for the rendering of such service. These reports to the State Board are required to be made at a specified time under the liability of a penalty for neglect; and it is largely the rule throughout the State that the compilation of these reports must be made during the terms of the District or Circuit Courts, when the duties of the clerks require their presence in court, hence necessitating the employment of extra clerical labor to comply with the requirements of Sec. 13.

There is no provision in chapter 151, laws of 1880, made for a pen-

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alty for fraudulent or false statements relating to births, marriages, and deaths. This is an omission which should be corrected. There are on file in this office, reported facts showing the necessity for legislative action. I would suggest that section six be amended by inserting after the word "act," in the eighth line, the following words:

"Any person who shall knowingly make any false certificate, statement, return, or receipt, relative to any birth, marriage, death, or still-birth, under the provisions of this chapter, shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be punished by a fine of not less than ——— dollars, nor more than ——— dollars, or by imprisonment in the county jail not less than —— days, nor more than —— days, or by both fine and imprisonment, at the discretion of the court."

In other States instances are on record where attempts were made to secrete the crime of abortion, by false certificates as to cause of death. This is a strong reason for this provision in the law.

Section 3, chapter 159, laws of 1876, provides for the printing and distribution of reports of the various State institutions. The State Board of Health has been created since the enactment of this law. Its provisions are not applicable to the State Board of Health. But thirty-five hundred copies of the report of the State Board can be printed under the law of 1876. Of that number one thousand copies are to be distributed to members of the legislature, twelve hundred copies are to be bound with other public documents, and five hundred copies distributed for miscellaneous purposes, leaving but eight hundred copies for the use of the State Board. It is decidedly important that every local board of health in the State, and health officers of each local board be furnished a copy of this report, as it contains the rules, regulations and all action, and decisions of the State Board, relative to matters coming within the purview of the health law of the State. There are nearly sixteen hundred township boards of health, and nearly four hundred boards of incorporated cities and towns. Chapter 159, laws of 1876, should be amended so as to provide for the printing of five thousand copies of the report of the State Board of Health, and that all copies in excess of the twenty-seven hundred shall be delivered to the State Board of Health; and said Board should be required to furnish one copy to the clerk of each incorporated city and town, and the clerk of each township; and one copy to the health physician of each local board of health, the same to be delivered to their successor at the expiration of their term of office.

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FINANCIAL STATEMENT.

The following is a statement of expenditures by the State Board of Health from the fifth day of May, 1880 to September 30, 1881, showing for what purpose, to whom paid, and the number of the vouchers on which the same was paid. The vouchers were audited by the Board, and by the President, in accordance with sections 10 and 12, chapter 151, laws of 1880, and duplicates of all vouchers have been paid by the State Treasurer, on warrants drawn by the Auditor of State:

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FINANCIAL STATEMENT.

DATE.	Voucher.	TO WHOM AND FOR WHAT.	AMOUNT.
1880.			
June 16	1	*Mills & Company.*	
		1 8-quire record	$ 18.00
		200 circulars, ½ letter	4.00
		200 circulars, ½ note	2.00
		2,000 manilla envelopes, No. 6	4.00
		1 seal	4.00
		Printing 2,000 envelopes	3.00
		500 envelopes, No. 6½	3.00
		500 manilla envelopes, No. 11	4.00
		2 reams lithograph letter-heads, (Secretary)	14.00
		1 ream lithograph letter heads (President)	7.00
		3,000 circulars, Form 3B	5.00
		5,000 circulars, Form 7A	11.00
		200 Form 16, index to register of births	2.75
		200 Form 17, index to register of deaths	2.75
		150 circulars to clerks	2.00
		200 Form 14, register of physicians and midwives	4.00
		200 Form 13, register of deaths	4.00
		200 Form 12, register of births	4.00
		200 Form 18, register of marriages	4.00
		200 Form 19, register of health officers	3.25
		200 sample books, Forms 4 and 3	10.00
		200 sample books, Form 1	6.00
		200 sample books, Form 2	8.00
		150 sample books, Form 5	6.00
		200 Form 19, register of still-birth	4.00
		1 6-quire expense record	14.00
		4 reams letter-head (members of the board)	28.00
		1 4-quire record of health officers	6.00
		1 8-quire record of distribution	11.50
June 17	2	*Mills & Abdill.*	
		1 ruling pen, 85c; inkstand, $2,25, mucilage stand, $2.50 2 paper weights, $1.30; 4 inkstands, $3; copy press $13.50	5.60 17.80
		1 letter book, $4.50; brush 50c., water cup, 75c	6.20
		4 rubber pad, $1,40: 4 sheets blotting paper, 60c	2.00
		2 blank books (D. and L.)	2.40
		1 letter scale	12.00
June 17	3	*Iowa State Register.*	
		200 circulars, Form 4B	1.75
		12 stair cards	1.25
		2,000 circulars, Form 6B	7.50
		1,000 blanks, Form 2C	10.50
		1,000 blanks, Form 1C	7.50
		1,000 blanks, Form 8B (health physicians)	5.00
		1,000 blanks, Form 9B (township clerks)	3.00
		1,000 envelopes, Form 2A	3.00
		125 circulars, Form 10B	1.50
July 1	4	500 envelopes, Form 3A	1.25
		100 postal cards, Form 1D	1.00
		200 labels	.75
		500 circulars, Form 10B	1.75

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FINANCIAL STATEMENT—CONTINUED.

DATE.	Voucher.	TO WHOM AND FOR WHAT.	AMOUNT.
1880.			
June 1	5	*American Express Company.*	
		Package, Lansing, $1; Lake Mills, 40c; Clarinda, 40c; Waterloo, 40c	$ 2.20
		Package, McGregor	.55
July 2	6	*Mills & Company.*	
		Slips, names of counties	1.50
		200 Form 3C blanks	4.00
		1,000 blanks Form 2C	9.00
		100 copies chapter 151, laws 1880	2.50
May 31	7	*C. H. Lathrop.*	
		1 copy Iowa Medical Directory	1.50
May 31	8	*United States Express Company.*	
		Transportation of packages	2.05
July 28	9	*Carter & Hussey.*	
		2,750 manilla envelopes	9.00
July 22	10	*L. Harbach.*	
		1 office stool	1.75
June 7	11	*Multigraph Company.*	
		1 copying tablet	3.70
July 31	12	*Secretary of State.*	
		100 six cent postal stamps	6.00
		100 three cent postal stamps	3.00
		100 two cent postal stamps	2.00
		1,400 one cent postal stamps	14.00
		200 Congress tie envelopes	9.00
		100 postal cards	1.00
Aug. 3	13	*Des Moines Post-office.*	
		600 one cent stamps	6.00
		500 three cent envelopes	16.20
Oct. 1	14	200 three cent stamps	6.00
		100 three cent stamps	3.00
Nov. 5	15	*Carter & Hussey.*	
		500 manilla envelopes	2.25
		150 circulars, Form 11B	3.50
		1,500 return of deaths, Form 6	43.00
		1,500 return of marriages, Form 5	43.00
		1,500 return of births, Form 4	43.00
		300 return of still-births, Form 7	8.86
		100 rollers	3.00
		Stitching	1.00
Aug. 5	15½	*L. F. Andrews (Secretary).*	
		Salary, quarter ending August 5	250.00
Nov. 2	16	*Redhead, Wellslager & Co.*	
		1 dozen Senate pads	3.00
		1 ream legal cap	3.25
		½ pint Carter's ink	.40
Nov. 17	17	*Osgood & Harris.*	
		2 towels	.50
Nov. 1	18	*Weaver & Maish.*	
		1 hair brush	1.75
		1 comb	.25
		1 box soap	.40
Nov. 2	19	*Mills & Abdill.*	
		1 scratch book	.20
		1 index memoranda	.35

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FINANCIAL STATEMENT—CONTINUED.

DATE.	Voucher.	TO WHOM AND FOR WHAT.	AMOUNT.
1880.			
Oct. 30	20	*L. F. Andrews.*	
		1 box pencils	$ 3.00
		1 rule	.50
		1 rule	.25
		1 bottle ink	1.00
		1 bottle carmine	.30
		2 boxes bands	.50
		1 glass tumbler	.10
		1 door key	.25
		1 bottle mucilage	.35
Nov. 5	21	*L. F. Andrews (Secretary).*	
		Salary quarter ending November 5	250.00
Nov. 2	22	*Des Moines Post-office.*	
		600 one-cent stamps	6.00
		100 10-cent; 25 5-cent; 50 2-cent; 100 1-cent stamps	13.25
August 3	23	*C. H. Lathrop.*	
		Iowa Medical Directory	1.50
Nov. 3	24	*Iowa State Register.*	
		100 slips from Daily	.75
		150 circulars, Form 12B	3.75
		1,000 blanks, Form 8B	5.00
		1,000 blanks, Form 1C	7.50
Nov. 9	25	*Des Moines Post-office.*	
		200 3-cent stamps	6.00
Nov. 9	26	*Secretary.*	
		Cleaning office	1.50
Nov. 10	27	*James L. Loring (Member of Board).*	
		Postage and envelopes	4.00
Nov. 10	28	*Des Moines Post-office.*	
		1,200 3-cent stamps	36.00
Nov. 10	29	*Mills & Abdill.*	
		1 volume "Schuman on Heat"	1.75
Dec. 1	30	*United States Express Company.*	
		Package transportation	.75
Nov. 23	31	*American Express Company.*	
		Package transportation	1.15
Dec. 1	32	*Des Moines Post-office.*	
		3,000 1-cent stamps	30.00
		United States Postal Guide	1.50
Nov. 26	33	*Holland & New.*	
		Painting sign	10.00
Nov. 30	34	*Mills & Company.*	
		5,000 envelopes, Form 9A (printing)	1.25
		500 envelopes, Form 10A	1.25
		100 vouchers, Form 3C	2.00
		500 printed envelopes	2.75
		3,000 manilla envelopes, No. 10. Form 2A	12.00
		5,000 circulars, Form 17B, (scarlet fever)	38 00
		5,000 circulars, Form 18B, (diphtheria)	38.00
		5,000 circulars, Form 14B, (clerks and health officers)	35.00
1881.			
Jan. 4	35	*Iowa State Register.*	
		3,000 circulars, Form 15B	6.00
		2,500 circulars, Form 16B (on drainage and sewerage)	40.65

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FINANCIAL STATEMENT--CONTINUED.

DATE.	Voucher.	TO WHOM AND FOR WHAT.	AMOUNT.
1881.			
Jan. 4	35	5,000 circulars, Form 13B (rules for local boards) ..	$ 39.80
Jan. 8	36	*Iowa State Leader.*	
		2 Brown's Letter Files	2.00
Dec. 11	37	*U. S. Express Co.*	
		Package transportation.....	.25
Dec. 6	38	*American Express Co.*	
		Package transportation.....	.25
Nov. 30	39	*Capital City Gas Co.*	
		Gas.....	4.50
Jan. 31	39½	*Mills & Company.*	
		1 rubber stamp..	2.50
		150 circulars, form 19B.....	1.25
		300 blanks, Form 8C.....	4.00
		2,00 circulars, Form 21B (small-pox).....	21.00
		3,000 half-sheet circulars, Form 22B.....	7.00
Jan. 8	40	*J. D. Seeberger.*	
		1 step-ladder.....	1.75
Jan. 1	41	*Redhead, Wellslager & Co.*	
		1 bottle French ink.....	.60
		1 bottle Carter's ink..	.50
		2 gross bands.....	.70
Feb. 5	42	*L. F. Andrews, Secretary.*	
		Salary quarter, ending February 5....	250.00
Feb. 1	43	*Carter & Hussey.*	
		Patching and bricking letter heads.....	1.50
Feb. 2	44	*Des Moines Post-office.*	
		500 postal cards.....	5.00
Feb. 28	45	*Capital City Gas Co.*	
		200 cubic feet of gas.....	.60
Jan. 31	46	400 cubic feet of gas.....	1.20
March 1	47	*Carter & Hussey.*	
		500 envelopes.....	2.75
		Printing 450 postal cards.....	1.25
March 30	48	Binding 10 record books.....	45.00
March 30	50	*Des Moines Post-office.*	
		1,000 one cent No. 6 envelopes.....	11.60
		500 three cent No. 4½ third quality envelope.....	17.04
		2,000 two cent stamps.....	40.00
April 1	51	*Redhead, Wellslager & Co.*	
		1 dozen scratch books..... ...	3.00
		Dunglison's Medical Dictionary.....	8
		12 gross, No. 5 bands.....	3.75
March 31	52	*Mills & Company.*	
		Mounting map	2.00
		1,000 circulars, Form 23B.....	4.50
		100 postal cards, Form 10C.....	1.25
April 19	53	*R. N. Hyde.*	
		Cleaning room.....	2.00
May 1	54	*Secretary.*	
		Express, package to Red Oak.....	.25
		Cleaning furniture (office).....	.50
March 31	55	*Capital City Gas Co.*	
		100 feet of gas.	.30

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FINANCIAL STATEMENT—CONTINUED.

DATE.	Voucher.	TO WHOM AND FOR WHAT.	AMOUNT.
1880.			
May 2	56	*L. F Andrews (Secretary).*	
		Salary for quarter ending May 5	$ 250.00
May 3	57	*H. H. Clark.*	
		Circulars	3.00

EXPENDITURES FOR MEETINGS OF THE BOARD, 1880.

1880			
May	5.	P. W. Lewellen, attendance and mileage	$ 27.50
		W. H. Dickinson, attendance	5.00
		F. F. Roberts, attendance and mileage	24.00
		J. L. Loring, attendance and mileage	5.00
		J. F. McJunkin, attendance and mileage	19.00
		E. M. Reynolds, attendance and mileage	22.50
		J. M. Hull, attendance and mileage	34.00
		H. H. Clark, attendance and mileage	38.00
		W. S. Robertson, attendance and mileage	17.00
Nov.	10.	P. W. Lewellen, attendance and mileage	30.00
		W. H. Dickinson, attendance	5.00
		G. F. Roberts, attendance and mileage	28.00
		E. M. Reynolds, attendance and mileage	23.00
		J. M. Hull, attendance and mileage	34.00
		W. S. Robertson, attendance and mileage	20.00
		J. L. Loring, attendance and mileage	8.00
			$340.00

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EXPENDITURES FROM MAY 5 TO SEPTEMBER 30, 1881.

DATE.	Voucher.	TO WHOM AND FOR WHAT.	AMOUNT.
1881.			
May 26	58	*Mills & Company.*	
		2,000 circulars, Form 25A (Treatment of Drowned).	$ 13.00
		1,000 pamplet report on pneumonia among cattle...	15.00
		2.000 pamphlets, Form 24A (Treatment of Drowned)	6.00
		1,000 Rules of State Board, for posting, Form 26B.	10.00
		2,000 blanks, reports, Form 2C	18.00
		½ ream letter heads	8.00
		1,500 circulars, Form 27B (transportation of corpses)	6.00
		2,000 circulars to local boards	5.75
June 1	59	*Des Moines Post-office.*	
		100 one cent No. 9 wrappers.....	1.12
		1,500 one cent No. 6 envelopes	17.40
		100 ten cent; 100 five cent stamps.....	15.00
June 1	60	*Carter & Hussey.*	
		250 envelopes, No. 10, Form 1A	1.75
		475 envelopes, No. 6. Form 3A	1.00
		2,500 envelopes, No. 10, Forms 2A and 5A	11.75
		100 labels (direction)	1.25
May 6	61	*J. B. Holland.*	
		2 volumes Buck's Hygiene	12.00
May 7	62	*Sanitary Engineer.*	
		1 volume 1880, bound	5.00
		Subscription volume 4	3.00
June 1	63	*Redhead, Wellslager & Co.*	
		1 gross pens	.75
		1 quarter gross bands.....	3.75
		1 quart Carter's fluid	.75
		1 inkstand	.70
		1 bottle carmine.....	.75
		1 finger dampener.....	.75
May 31	64	*Iowa State Register.*	
		500 envelopes, Form 12A.....	1.25
		150 circulars, Form 12B.....	3.25
		150 circulars, Form 11B.....	2.50
June 5	65	*L. F. Andrews.*	
		Salary, month ending June 5.....	100.00
May 31	66	*United States Express Company.*	
		Package transportation	.85
June 24	67	*Carter & Hussey.*	
		1,000 envelopes, Form 10A.....	5.00
		1,500 return blanks, Form 4, births.....	32.50
		1,000 return blanks, Form 5, marriages	24.25
		1,000 return blanks, Form 6, deaths	24.25
		300 return blanks, Form 7, still-births.....	16.00
June 24	68	*Des Moines Post-office.*	
		2,500 one cent wrappers.....	28.00
July 5	69	*L. F. Andrews.*	
		Salary for month ending July 5.....	100.00

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FINANCIAL STATEMENT—CONTINUED.

DATE.	Voucher.	TO WHOM AND FOR WHAT.	AMOUNT.
1881.			
June 27	70	*Mills & Company.*	
		18 lbs. red Ex. paper, $1 62; ½ r'm statements, 65 cts.	$ 2.27
		1,000 circulars, Form 8B	5.25
		5,000 pamphlets, nosological tables	47.00
June 6	71	*W. H. Pratt.*	
		Two volumes White's Geology	6.00
June 22	72	*F. H. Little.*	
		Procuring water for analysis (Muscatine)	1.50
June 11	73	*Thomas Hackett.*	
		Janitor work for May	1.50
May 22	74	*American Express Company.*	
		Package transportation	2.00
Aug. 6	75	*R. J. Farquharson (Secretary).*	
		Salary for quarter ending August 5	300.00
		Expense to small-pox conference, Chicago	26.65
Aug. 5	76	*L. F. Andrews.*	
		Salary month ending August 5	100.00
July 2	77	*American Health Association.*	
		Five volumes reports	27.00
July 2	78	*Carter & Hussey.*	
		Printing 500 envelopes, Form 4A	3.00
		2,000 blank permits, Form 6E, trans. of corpses	15.00
July 28	79	*Des Moines Post-office.*	
		1,000 one cent stamps	10.00
July 1	80	*Weaver & Maish.*	
		One hygrometer	8.00
June 20	81	*Frank Pelton.*	
		One map of city of Des Moines	7.00
July 30	82	*L. Harbach.*	
		Hygrometer case	5.00
Aug. 1	83	*Mitchell, Bartlett & Crain.*	
		Six one gallon acid bottles	3.30
Aug. 1	84	*United States Express Company.*	
		Package transportation	3.70
July 7	85	*Junkermann & Haas* (Dubuque).	
		⅔ dozen ½ gal. acid bottles and boxing	2.86
July 16	86	*American Express Company.*	
		Package transportation	.25
Aug. 3	87	*Professor Thomas E. Pope.*	
		Analysis of eight waters at $2 50	22.50
		Analysis of eleven waters at $1.75	19.25
		Expressage paid on waters	6.45
Aug. 31	88	Examining of samples water at $2.50	22.50
		To fixing melting point of cerecloth mixture	2.50
		Expressage on water	1.75
Aug. 30	89	*Des Moines Post-office.*	
		2,000 one cent stamps; 500 two cent stamps	30.00
		500 postal cards	5.00
Sept. 1	90	*Mills & Company.*	
		Manilla wrapping paper	.20
		1,000 circulars, Form 27B, transportation of corpses.	4.75
		One ream lithograph letter-heads	10.00
Aug. 1	91	*Redhead, Wellslager & Company.*	
		Pencils	.20

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EXPENDITURES—CONTINUED.

DATE.	Voucher.	TO WHOM AND FOR WHAT.	AMOUNT.
1881.			
Aug. 1	91	*Redhead, Wellslager & Co.*	
		1 White's Geography of Iowa	$ .50
		1 card rack	1.25
		Picture nails	.15
		1 set drawing instruments	4.00
Aug. 15	92	*W. E. Davis.*	
		Janitor service	3.00
Aug. 11	93	*James B. Mason.*	
		6 G. S. one-half bottles and boxing	1.90
Sept. 1	94	*Carter & Hussey.*	
		1 quire flat-letter	.20
		200 blanks, Form 10C	1.50
Aug. 12	95	*McBride & Will.*	
		4 G. S. bottles and boxing	1.25
Aug. 12	96	*Bibbins & Kelly.*	
		2 one-half gallon G. S. bottles and boxing	.75
Aug. 4	97	*Mitchell, Bartlett & Crain.*	
		1 gallon G. S. bottle	.40
Sept. 5	98	*L. F. Andrews.*	
		Salary for month ending September 5	83.33
		Total miscellaneous	$ 3,401.31
		Attendance of members	528.00
		Postage to members	16.46
		Total expenditures	$ 3,945.77

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EXPENDITURES FOR MEETINGS OF THE BOARD FOR 1881.

May 5.	W. S. Robertson, attendance and mileage, $20; postage, $4	$	24.00
	P. W. Lewellen, attendance and mileage, $30; postage, $2		32.00
	E. M. Reynolds, attendance and mileage, $23; postage, $2		25.00
	H. H. Clark, attendance and mileage, $38; postage, $8.46		46.46
	Smith McPherson, attendance and mileage		30.00
	W. H. Dickinson, attendance and mileage		5.00
	J. M. Hull, attendance and mileage		34.00
	James L. Loring, attendance and mileage		8.00
		$	204 46
	Expenditures for Board meetings for 1880		340.00
	Total expenditures for Board	$	544.46

CLASSIFIED EXPENDITURES.

Chemical analysis	$	84.41
Members attending meeting		528.00
Instruments and books		65 75
Paper and stationery		119.63
Postage Secretary's office		298.61
Postage, members		20.46
Printing and binding		1,038.78
Secretary, salary		1,300.00
Clerk		388.33
Special investigations		26.65
Express on packages		11.05
Fixtures		46.60
Gas		6.60
Janitor and miscellaneous items		10.90
	$	3,945.77

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RECEIPTS—WARRANTS ON STATE TREASURER.

DATE.	No. of war.	TO WHOM PAYABLE.	AMOUNT.
1880.			
May 6	33263	W. S. Robertson	$ 17.00
	33264	P. W. Lewellen	27.50
	33265	G. F. Roberts	24.00
	33266	J. L. Loring	5.00
	33267	J. F. McJunkin	19.00
	33268	E. M. Reynolds	22.50
	33269	J. M. Hull	34.00
	33270	H. H. Clark	38.00
	33271	W. H. Dickinson	5.00
June 23	33558	Mills & Company	199.25
June 23	33559	Iowa State Register	41.00
	33560	Multigraph Company	3.70
	33561	Mills & Abdill	46.00
July 6	33739	L. F. Andrews	24.50
August 6	34054	L. F. Andrews	250.00
August 6	34055	L. F. Andrews	71.50
Oct. 7	34539	Des Moines post-office	9.00
Nov. 8	34776	L. F. Andrews	250.00
Nov. 10	34807	L. F. Andrews	250 96
Nov. 10	34808	P. W. Lewellen	30.00
Nov. 10	34809	W. H. Dickinson	5.00
Nov. 10	34810	G. F. Roberts	28.00
Nov. 10	34811	J. L. Loring	8.00
Nov. 10	34812	E. M. Reynolds	23.00
Nov. 10	34813	J. M. Hull	34.00
Nov. 10	34814	W. S. Robertson	20.00
Dec. 4	35006	L. F. Andrews	173.65
1881.			93.45
Jan. 8	35539	L. F. Andrews	
Feb. 5	35758	L. F. Andrews	290.80
March 12	35975	L. F. Andrews	10.80
April 5	36154	L. F. Andrews	134.52
May 4	36416	L. F. Andrews	294.46
May 4	36417	L. F. Andrews	255.75
June 7	36657	L. F. Andrews	266.32
July 7	36861	L. F. Andrews	296.52
July 7	36865	L. F. Andrews	1.00
August 5	37181	L. F. Andrews	511.76
Sept. 6	37386	L. F. Andrews	220.83
			$ 3,945.77

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WORK OF THE BOARD.

The law creating the State Board of Health took effect April 3, 1880. The Board was organized May 5th. To put in operation the machinery of a system ramifying through every county, city, town, and township in the State required time. Owing to unavoidable delay incident to all new enterprises, the necessary blank forms for the use of clerks of the District and Circuit courts were not delivered until July 1st. There was a further delay in the reception of registers and returns of births, marriages, deaths, and still-births; so that practically the law was in operation less than three months in 1880.

Another source of delay was, copies of the law were not received by township clerks until several months after the adjournment of the legislature. In many instances they had not been received as late as November; so that township trustees had no knowledge of what was required.

Under all the circumstances, satisfactory progress has been made. Sanitary science and hygiene are subjects to which the people at large have paid little or no attention. They are new to them, and they have a meagre conception of their importance. They require educating and instruction. Hitherto, their chief end and aim has been to supply present necessities, prepare graveyards, and—fill them. Hence, the work of the State Board, during its existence thus far, has been to impart information, rather than attempt to coerce compliance with the statute, believing that public sentiment in favor of the law would secure more general obedience than force. Nothing is so costly as sickness. "Public health is public wealth." It is probably true that the loss from preventable sickness is more than the entire cost of the State government. To enlighten the people, and teach them how to escape sickness, is the sole object of this Board. Practical experience has demonstrated the wisdom of these organizations. Since Massachusetts first led off with a state board of health, in 1869, twenty-three States have organized and put in operation similar boards. These rapidly multiplying organizations evidence that the people have learned, and are learning the fact, that "disease and death are largely preventable." It has therefore been the aim of the Secretary to scat-

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ter as widely as possible the information prepared by the Board for the prevention of communicable diseases. The frequent repetition of requests for circulars issued by the Board indicates an increase of public attention in sanitary matters. There is strong hope that the increase of sanitary knowledge, and the consequent pressure of public opinion, will remove the apprehension which now so largely prevails, that the object and intent of the law is oppressive and subversive of individual freedom; and on the contrary, firmly establish the advantage and necessity of a central authority to which appeals can be made in disputed points, and from which shall come those measures of reform which will diminish the sorrow and suffering of a people liable to disease.

There is established the gratifying fact that in no State where a board of health has been created by statute has the law been repealed; but, on the contrary, constant modification and progress have been made, to meet advances of public sentiment and sanitary knowledge.

Respectfully submitted,

L. F. ANDREWS,
Secretary for 1880.

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REPORT FOR 1881.

IOWA STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
DES MOINES, IOWA, October 1, 1881.

To the President and members of the State Board of Health.

GENTLEMEN—I have the honor herewith to submit, for your consideration, the following report of the affairs of the Board, from the fifth of May, 1881, to October 1st, this being the period fixed by law for the termination of the State year, and for the filing of all reports of State institutions. This report will be brief for the following reasons: Upon assuming the duties of Secretary on May 5th, I found that Mr. Andrews, my predecessor as Secretary, had by the action of the Board, been retained as assistant secretary. As he had, already begun his report, in detail, of all the proceedings, and other transactions of the Board, from its origin, I thought it but just to him and acceptable to other parties, that he should be allowed to finish it.

The following details are given, as nearly as possible, in the chronological order in which they occurred.

ROOMS IN THE CAPITOL FOR THE BOARD.

Soon after my appointment, in company with, and at the request of, Dr. Dickinson, a committee appointed at the last meeting, for the purpose, I made a written application for a suit of three (3) rooms, situated in the basement floor, and occupying the southwest corner of the capitol. These rooms are admirably adapted to the purpose, being sufficiently roomy, easily accessible, somewhat removed from the noise and bustle of the main floor, and provided with a large, strong room or vault for the better preservation of the archives, of great importance, both legally and statistically, which will, in a few years, accumulate on our hands.

TRANSPORTATION OF CORPSES.

At various times great trouble and annoyance has occurred to all parties concerned in the transportation of dead bodies, both to the shippers and the carriers, and this from the fact that there was no law,

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rule, nor regulation on the subject; nor was there any uniformity in the practice of the various express and railroad companies engaged in this particular kind of transportation.

At the request of Dr. W. F. Peck, Surgeon-general of the Chicago, Rock Island & Pacific Railway, I drew up the following rules, which, after being approved and signed by the President, were published for the information of all parties concerned. Copies of these regulations have been forwarded to the different railroads, the steamboat agents at the river towns, and to all undertakers, wherever names and addresses could be procured.

The regulations are now in force throughout the State, and, as far as known, give general satisfaction.

[FORM 27B.]

TRANSPORTATION OF CORPSES — RULES FOR THE TRANSPORTATION OF CORPSES BY RAILROADS AND STEAMBOATS IN THE STATE OF IOWA.

IOWA STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY.
DES MOINES, IOWA, May 20, 1881.

RULE 1. The transportation of bodies of persons dead of small-pox, Asiatic cholera, or yellow fever is absolutely forbidden.

RULE 2. From November 15th to March 15th, all dead bodies may be transported without restriction, except those dead of diphtheria, scarlet fever, typhus or typhoid fever, in addition to being in a metallic or wooden coffin, and this enclosed by a light wooden box, must be closely wrapped in a carbolated cere-cloth, or *some equally effective substitute.**

RULE 3. From March 15th to November 15th, all bodies presented for transportation must be prepared as described in the latter part of Rule two.

RULE 4. Every dead body must be accompanied by a physician's certificate of death, a permit for transportation from the clerk of the local board of health, and a written certificate from the shipping undertaker that the corpse has been prepared for transportation in accordance with the rules of the Iowa State Board of Health.

*By order of the State Board, an india rubber cloth lined with a cloth saturated with an aqueous solution of carbolic acid, is an effective substitute.—SECRETARY.

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INSTRUCTIONS FOR UNDERTAKERS.

RULE 5. A carbolated cere-cloth is a strong cotton winding-sheet, which has been dipped in a melted mixture of wax, tallow or lard and carbolic acid; a cheaper substitute is one dipped in a strong watery solution of carbolic acid, or of chloride of zinc (Burnett's solution).

W. S. ROBERTSON, M. D., *President.*

R. J. FARQUARSON, M. D., *Secretary.*

"Rules and regulations made by the State Board of Health and directed to local board of cities, towns, etc., are of full force and effect upon the people without subsequent endorsement or action of such local boards."—*Decision of the Attorney-general, January 4, 1881.*

Many inquiries being made as to the "carbolated cere-cloth" and ingredients necessary for its manufacture, at my suggestion, Prof. Thomas E. Pope of the State Agricultural College, kindly undertook a series of experiments to determine the proper proportion of these ingredients.

From the results of his experiments, the following formulæ were prepared and published for the benefit of undertakers and other parties concerned.

[FORM 30B.]

STATE OF IOWA—HEALTH DEPARTMENT—TRANSPOTATION OF CORPSES BY RAILROADS AND STEAMBOATS—CARBOLATED CERE-CLOTH FORMULA.

STATE BOARD OF HEALTH,
OFFICE OF SECRETARY,
DES MOINES, August 20, 1881.

Formula for mixture of wax and tallow, to be used by undertakers in the preparation of "Carbolated Cere-Cloth."

FOR SUMMER.

Wax one (1) part, tallow four (4) parts, melting point, 124 degrees F.

FOR WINTER.

Wax one (1) part, tallow thirty (30) parts, melting point, 98 degrees F. For either, carbolic acid *ad libitum.*

W. S. ROBERTSON, M. D., *President.*

R. J. FARQUHARSON, M. D., *Secretary.*

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[FORM 6E.]

STATE OF IOWA—HEALTH DEPARTMENT—TRANSPORTATION OF CORPSES.

PHYSICIAN'S CERTIFICATE OF DEATH.

.....Iowa,.....188

Name of deceased.....
Date of death.....188 . Age.....yrs.,.....mos.,.....days
Place of death.....
Cause of death.....
I hereby certify that the same is true to the best of my knowledge and belief.

.....M. D.

Residence of certifying physician..... County of..... Iowa.

UNDERTAKER'S CERTIFICATE.

.....Iowa,.....188

.....hereby certify that the dead body of..... named in the foregoing physician's certificate, has been prepared by.....for transportation in accordance with the rules of the Iowa State Board of Health.

.....Undertaker.

Residence of undertaker.....

TRANSIT PERMIT.

In accordance with the rules of the Iowa State Board of Health, dated May 20, 1881, permission is hereby given to..... company,..... for the transportation of the dead body of..... (If minor give parent's names.)..... from ....., .. to..... for interment at.....
Date of death..... 188 . Age.....yrs.,.....mos.,.....days
Place of death.....
Certificate of physician.....

.....M. D.

.....
Clerk of Board of Health.

[Filing.]

STATE OF IOWA—HEALTH DEPARTMENT—TRANSPORTATION OF CORPSES—

TRANSIT PERMIT.

From.....to.....Body of..... Died.....188 . At .....
Cause of death.....

RULES OF THE IOWA STATE BOARD OF HEALTH.

RULE 1. The transportation of the bodies of persons dead of small-pox, Asiatic cholera, or yellow fever is absolutely forbidden.

RULE 2. From November 15th to March 15th, all dead bodies may be transported without restriction, except that those dead of diphtheria, scarlet fever, or typhus or typhoid fever, in addition to being in a metallic or wooden coffin and this enclosed by a light wooden box, must be closely wrapped in a carbolated cere-cloth or some equally effective substitute.

RULE 3. From March 15th to November 15th, all bodies presented for transportation must be prepared as described in the later part of Rule 2.

RULE 4. Every dead body must be accompanied by a physician's certificate of death, a permit for transportation from the clerk of the local board of health, and a written certificate from the shipping undertaker that the corpse has been prepared for transportation in accordance with the rules of the Iowa State Board of Health

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RULE 5. A carbolated cere-cloth is a strong cotton winding-sheet, which has been dipped in a melted mixture of wax, tallow or lard and carbolic acid; a cheaper substitute is one dipped in a strong watery solution of carbolic acid, or of chloride zinc (Burnett's solution).

W. S. ROBERTSON, M. D., *President.*

R. J. FARQUHARSON, M. D., *Secretary.*

(This blank can be obtained on application to the Secretary of State Board of Health, Des Moines.)

June 30 and July 1st, being then in attendance at a conference called by the Illinois State Board of Health, on the subject of small-pox, these regulations were adopted by that Board, and are now in force in the State of Illinois.

I find from correspondence with all the State Boards of Health, and with the authorities of some States not having Boards of Health, that no general laws or rules in regard to the transportation of corpses exist in these various States, so that our Board has the honor of having originated this important sanitary measure, which is now occupying the attention of other State Boards.

SMALL-POX.

The alarming prevalence of small-pox in various parts of the Northwest, and especially in Chicago, induced the Illinois Board of Health to invite other State Boards and other sanitary authorities to meet them in council upon this in Chicago. By direction of the President, Dr. Robertson, I attended that conference. Beside the Illinois Board the following boards were represented in this Conference: National Board of Health, those of New York, Maryland, Iowa, Wisconsin, Minnesota, Michigan and Indiana: also of the cities of Chicago, Baltimore, Milwaukee, and Buffalo. After a most animated and thorough discussion a report and resolutions were adopted.

The report is too long for transcription here. The resolutions were as follows:

THE RESOLUTIONS.

RESOLVED, 1. That small-pox is very prevalent in European ports at which emigrants embark for the United States, and, owing to the customary delay of the emigrants at these ports, unprotected persons are liable to, and frequently do, become infected with that disease.

2. That vast numbers of immigrants are unprotected against small-pox infection, and hence contract the disease just before embarking for the voyage.

3. That ocean transit is now so rapid that a person becoming infected with the small-pox poison may, and often does, reach the ports of the United States, and, even by rapid railroad travel, may locate in Western towns before the disease becomes apparent in the individual.

4. That outbreaks of small-pox in many parts of the United States, and the

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liability to a wide and constant dissemination of the contagious and infectious material of that disease by means of the immense number of unprotected immigrants who daily land at our ports and immediately proceed to inland districts by railroads, demand the most energetic measures of health authorities to control the spread of this pestilence and to exterminate it wherever it maks its appearance in any community.

5. That to accomplish this desirable object there should be concert of action among the several sanitary organizations of the country, viz., National, State and municipal, and each in its own sphere should use its utmost power to stamp out this disease.

6. That, with a view to give practical effects to the objects of this conference, we recommend

(*a*) That Congress incorporate into the law regulating immigration a provision requiring protection from small-pox by successful vaccination of all immigrants.

(*b*) That the National Board of Health is requested to consider (in accordance with an act to prevent the introduction of contagious or infectious diseases into the United States, approved June 2, 1879), the propriety of making, promulgating and enforcing rules requiring the inspection at the port of departure of immigrants into this country, and the vaccination or re-vaccination of every immigrant who, upon such inspection, is found unprotected from small-pox. Or, failing in any case, or for any cause, to secure such vaccination or re-vaccination, to prevent such unprotected persons as may have come from or through any infected district from taking passage on any ship destined for this country during the period of incubation of the disease until such time shall have elapsed as shall make it certain that they are not carrying the germs of small-pox in their own persons.

(*c*) That notification be sent to the various steamship companies bringing immigrants to the United Statas that unless satisfactory evidence of recent vaccination be furnished (by certificate or otherwise) in the case of each immigrant arriving at any port of the United States such vessels should be quarantined for a sufficient length of time to insure the development of all undeveloped cases of small-pox, as well as for the discovery, if possible, of concealed existing cases which have developed during the voyage.

(*d*) That local health authorities should as far as practicable cause a thorough inspection of immigrants at all distributing points, and the detention at such points of all suffering from small-pox, and also the vaccination by the local authorities, if needed, of all immigrants who arrive at their destination.

(*e*) That to meet present emergencies the National Board of Health, by virtue of its power to prevent the introduction of contagious and infectious diseases into the United States and their spread from one State into another, take such measures as will secure the inspection of every immigrant before landing at the ports of the United States, and of the vaccination of all persons not protected.

(*f*) That a committee consisting of one from each State and local board represented be appointed, whose duty it shall be to take such measures as may be found necessary to accomplish the objects of these resolutions.

These resolutions were approved by the Illinois State Board immediately after their adoption, and upon my return, with the approval and signature of the President I forwarded the following approval:

The Iowa State Board of Health indorses the action of the sanitary conference, held in Chicago, June 29 and 30, for the prevention of the introduction of small-pox by immigration and its spread from one State to another, and will unite and co-operate to the full extent of its power and means in a systematic plan of operation to prevent the extension of this disease and secure general vaccination.

In view of the fact of the frequent introduction of small-pox into the interior of Iowa from immigrants, the Iowa State Board of Health would respectfully request the National Board of Health to secure the vaccination of all unprotected immigrants before they leave the ports of arrival in this country.

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The Iowa State Board of Health therefore earnestly requests all health officers and local boards of health to secure a careful inspection of all immigrants entering this State, and a prompt vaccination and re-vaccination of all immigrants not sufficiently protected against small-pox.

A recent newspaper item is to the effect that the National Board of Health had determined to put inspectors at Boston, New York, Philadelphia, Baltimore, and Port Huron, the principal landing places of European immigrants; also, at such principal distributing depots in the interior, as Buffalo, Chicago, St. Louis and Omaha.

How much truth there is in the above is not known; but the fact, that at the present writing, small-pox is increasing rapidly in Chicago, is undoubted and would seem to urgently call for some immediate and energetic action on the part of all authorities interested in the prevention of the dissemination of contagious diseases.

Outbreaks of small-pox have occurred during the past year in various parts of the State, some of which have been reported to this office by the proper authorities, but these instances were few in number, the presence of the disease generally becoming known through the columns of the daily press.

While in Davenport on July 2d, I accidentally heard of a case of small-pox in Scott county, some six miles from that city. Upon visiting the spot I found one of those mild cases of varioloid or modified small-pox, that are particularly dangerous from being mistaken for chicken-pox, and from the ability of the person to travel about and thus spread the contagion. There were two unvaccinated children in the family, but the mother positively refused my offer to vaccinate them, and denied the existence of small-pox on her son; however, the history of the case would show otherwise, as he had sickened in Tama county after having been exposed to the small-pox, had returned home and had sought in Davenport for a colored man who was familiar with nursing small-pox cases in the hospital. The importance of the earliest possible intelligence of an outbreak of small-pox in any part of the State cannot be too strongly urged upon the attention of the health officers of cities, towns and local boards.

Their attention is also called to the danger of mistaking mild cases of modified small-pox for chicken-pox; such an error of diagnosis is frequently followed by very grave consequences. By just such a mistake an outbreak of small-pox occurred among the inmates of Mercy Hospital, Davenport; indeed, all cases of chicken-pox during the prev-

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alence of small-pox in any part of the country should be regarded with the greatest possible doubt and suspicion. Before quitting the subject of small-pox I wish to add a few words on a most important point; *i. e.*, the necessity for the provision in every city, if not in every county, of a pest-house, or place suitable for the treatment of small-pox and of all other contagious diseases. The following is instructive and to the point: Hearing through the papers of the occurrence of a case of "spontaneous small-pox" at Lyons I made inquiries and learned that the case could be traced to a tramp from Chicago, who was taken ill with the disease in that town, was transferred from point to point in the town, then to the outskirts, where of course the neighbors objected to his presence, then to an island in the river, where, perhaps, as a natural result of this ambulating treatment of this case he was finally planted under the ground; net result being an expenditure of several hundred dollars, new cases from the dissemination of the contagion and suits for damages.

Winter after winter this terrible farce was acted at Davenport, until some one in an opportune moment urged upon the county and city authorities the propriety, the necessity, of providing a hospital for the proper care of such cases.

A joint appropriation of $2,500 was made by Scott county and the city of Davenport, and for this sum a neat, commodious, well ventilated hospital, affording ample accommodation for the treatment of twelve cases was built and furnished upon the grounds of Mercy Hospital, and placed under the charge of the Sisters of Mercy.

GLANDERS.

The communication of this loathsome affection from the horse to man does undoubtedly occur, but, fortunately, it is extremely rare. In compiling the deaths of 1879–80, one was put down as caused by glanders. I immediately wrote a letter to the physician reporting the case, but no answer has yet been received.

In August last, glanders was reported as prevailing in Lucas county, where, also, a case of its occurrence in a human subject was said to have been found. Upon addressing the physician in attendance, Dr. C. B. Powell, of Russell, I soon had a courteous and satisfactory reply which was to the effect that the patient in question, a lady, had an attack of erysipelas of the face, which followed, in a few days, and was apparently caused by discharge from the nostril of a horse, which was blown into her eye.

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As the horse was not one of those known to have glanders; as the case was one of well-marked erysipelas, and presented no symptom of glanders; and as the patient completely recovered in a few days, Dr. Powell correctly inferred that it was not a case of that terrible disease.

WATER ANALYSIS.

After some correspondence, Prof. Thomas E. Pope, professor of chemistry in the State Agricultural College, kindly consented to make analyses of all waters which might be sent to him.

As Professor Pope has performed this delicate and scientific work in the most prompt and satisfactory manner, and as he has made a merely nominal charge as his compensation, I would respectfully ask that he be publicly thanked by a vote of the Board, and that if, in imitation of other States, we are to have a State Analysist, he should by all means have the appointment.

The table of results furnished by Prof. Pope embraced the analysis of thirty waters used for drinking purposes: Ten river waters from the Mississippi, Iowa, Cedar, Des Moines and Raccoon rivers; thirteen shallow well waters, from various parts of the State; six deep well waters, four from Dubuque and two from Des Moines; and three specimens of melted ice, one from the Mississippi River at Davenport and two from the Des Moines River at Des Moines. Prof. Pope's results as given below are in parts in one million, these have been reduced to grains per United States gallon (58,328) to make them more intelligible to the public, and are to be found, together with detailed explanatory notes as to the sources of the different waters, in the report of Dr. Dickinson on the Water Supply of the State. No standard for the determination of the comparative purity of drinking water has ever yet been agreed upon by authorities; one fact is very evident, however, which is that the standard set up by most of the English authorities cannot be applied to our drinking waters without the disagreeable result of the rejection of most, if not all, the potable waters in America as unfit for domestic use.

In this connection it may be remarked that we should most devoutly wish that the experiments now being made by Prof. J. W. Mallet, of the University of Virginia, at the instance of the National Board of Health, may result not only in establishing some standard for the estimation of the qualities of drinking water from a chemical analysis of the same; the best mode of conducting that analysis; and lastly, if that is possible, of pointing out the connection between certain chemical conditions of water and its production of disease.

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TABLE I—WATER ANALYSIS.

Results expressed in parts per million (1,000,000).

	When taken.	Free ammonia.	Albuminoid ammonia.	Chlorine.	Suspended matter.	Solid residue on evaporation.	Loss on ignition.	What inorganic.	Hardness: One degree is equal to 470,000 of carbonate of calcium or its equivalent.
Muscatine well water				173 5		927		797	46
Muscatine river water		0.04	0.22	2.0	14.5	142	43	99	7
Marshalltown river water		0.0234	0.17	1.25	46	290	34	256	14
Marshalltown well water				268.9		1045		897	53
Anamosa river water		0.66	0.19	1.8					6.5
Anamosa, E. Booth's well				66.75		554		440	26
Anamosa, J. C. Dietz' well				20.7		268		208.5	10
Cedar Rapids Second Ward well water				86.1		947		846	27
Cedar Rapids First Ward well water				161.8		1129		961	38.5
Cedar Rapids river water		0 00	0.206	1.7	63.2	242	32.6	209.4	11
Ottumwa river water		0.04	0.400	2.75	381.4	582	64	518	5.5
Ottumwa well water				70.2		587		515	20.5
Dubuque well water				154.25		707		562.4	41
Dubuque artesian well that feeds water works				3.4		223	14	209	20.5
Dubuque water from level				3.75		254.4	17.4	237	23
Dubuque water from hydrant		0.00	0.030	3.50		248 4	16.2	232.2	23
Des Moines river water		0 026	0.130	1.95	3.5	157	11.6	145.4	10
Burlington river water		0.014	0.310	2.9	153	371	41.8	319.2	7.5
Burlington well water				87.5		865		750	56.5
W. H. D. No. 1	Aug. 4	0.120	0.060	82.4		730		644.8	38
W. H. D. No. 2	Aug. 4	0.0214	0.046	60.7		851.6		751.6	48
W. H. D. No. 3	Aug. 4	0.0534	0.150	76.3		1302.4		1198.4	70
E. G. No. 30	Aug. 4	0.0400	0.040	34.7		835.6		738.8	48
O. H. No. 1	Aug. 4	0.214	0.054	trace		12	4	8	0
O. H. No. 2	Aug. 4	0 240	0.034	trace		13	5	8	0
Davenport river water		0.088	0.320	1.35	30.4	295	31.4	203.6	9
Davenport well water		0.0266	0.124	49		751.6		701.6	32
Davenport ice water		0.266	0.194	trace		23.6	16.2	7.4	0
Clinton river water		0.0266	0 400	4.7	110	268.8	43.6	225.2	7
Clinton well water		0.033	0.082	18.8		564		462	32

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TABLE II.—IOWA WATER—ALBUMINOID AMMONIA.

(*Parts in 1,000,000—Water Unfiltered.*)

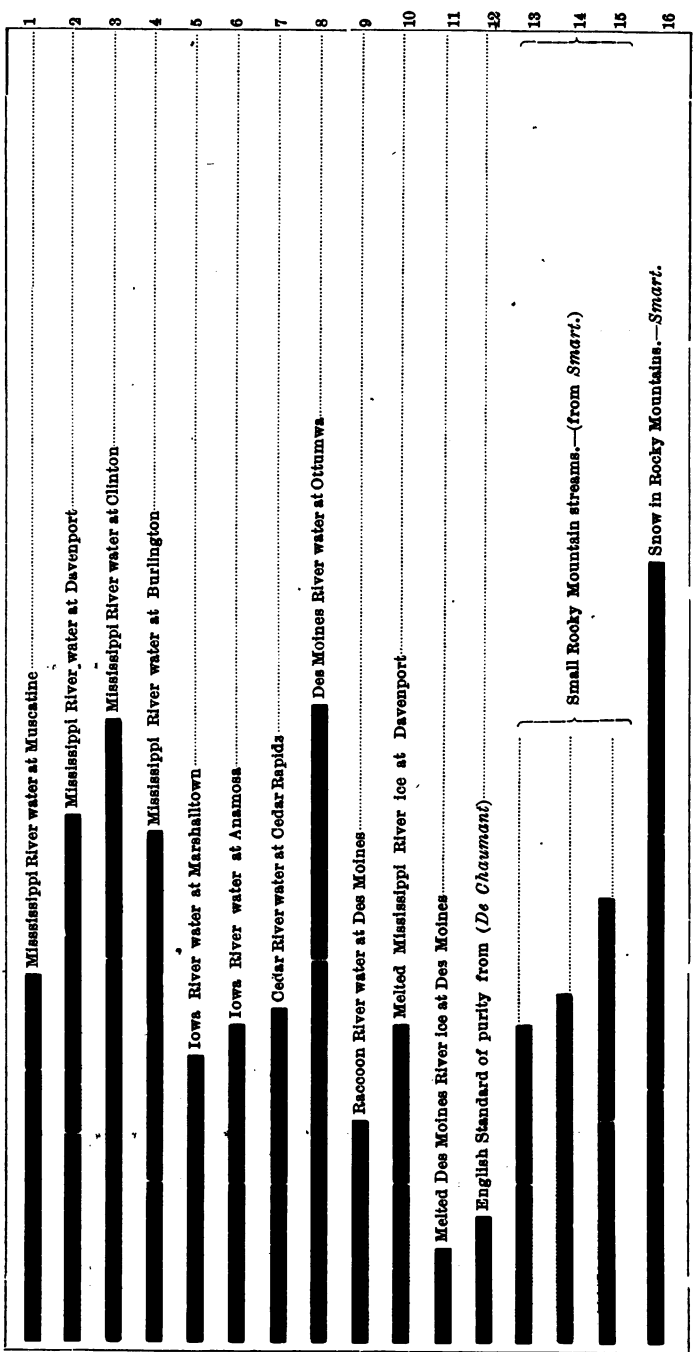
0.22 Mississippi River water at Muscatine 1
0.32 Mississippi River water at Davenport 2
0.40 Mississippi River water at Clinton 3
0 31 Mississippi River water at Burlington 4
0.17 Iowa River water at Marshalltown 5
0.19 Iowa River water at Anamosa 6
0.20 Cedar River water at Cedar Rapids 7
0.40 Des Moines River water at Ottumwa 8
0.13 Raccoon River water at Des Moines 9
0.19 Melted Mississippi River ice at Davenport 10
0.05 Melted Des Moines River ice at Des Moines 11
0.06 English Standard of purity from (*De Chaumant*) 12
0.19 13
0.20 Small Rocky Mountain streams.—(from *Smart.*) 14
0.28 15
0.50 Snow in Rocky Mountains.—*Smart.* 16

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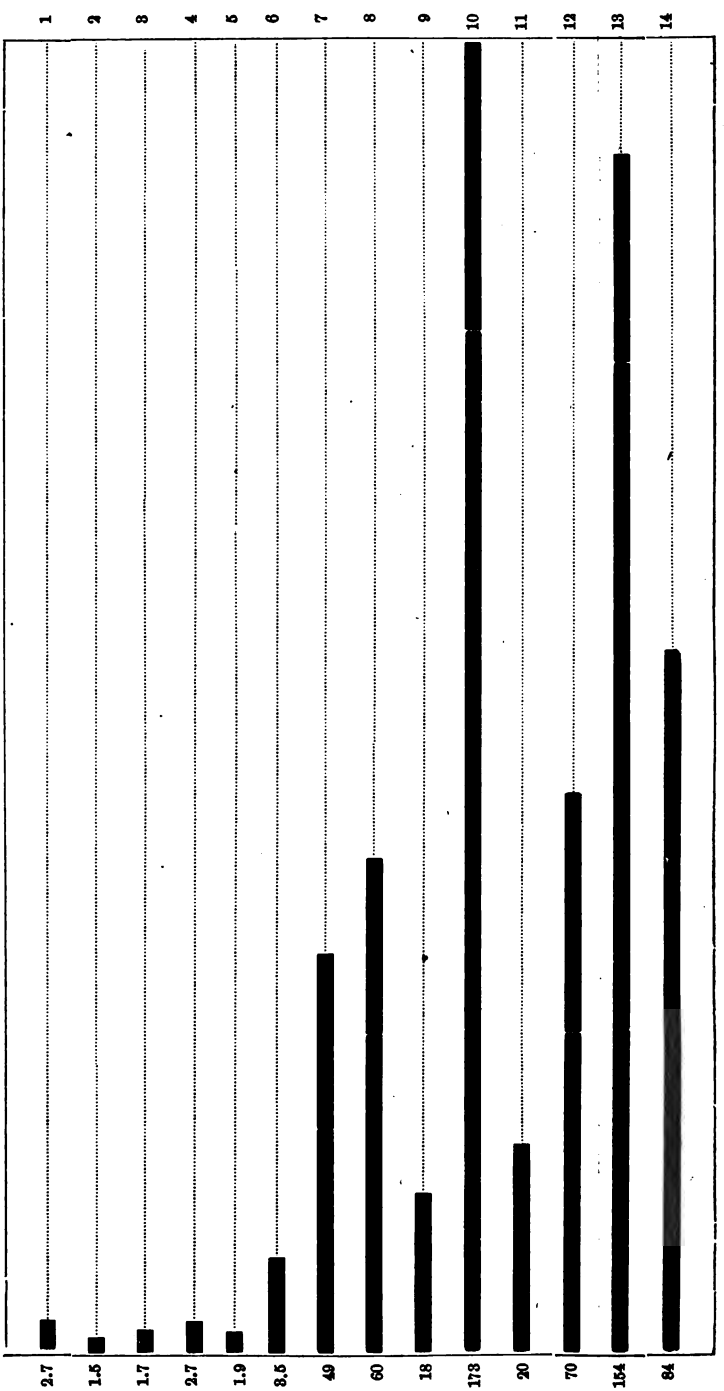
TABLE III—CHLORINE.

(Parts in 1,000,000.)



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EXPLANATION OF TABLE III.

1. Mean chlorine of four Mississippi River waters.
2. Mean of two Iowa River waters.
3. Chlorine of one Cedar River water.
4. Chlorine of one Des Moines River water.
5. Chlorine of one Raccoon River water.
6. Dubuque water supply (deep well).
7. Shallow well at Davenport.
8. Shallow well at Des Moines.
9. Shallow well at Clinton.
10. Shallow well at Muscatine.
11. Deitz's well at Anamosa.
12. Shallow well at Ottumwa.
13. Shallow well at Dubuque.
14. Second Ward well at Cedar Rapids.

See, also, report of Dr. Dickinson on Water Supply, for further description of these waters.

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CORRESPONDENCE WITH THE NATIONAL AND OTHER BOARDS OF HEALTH.

I. A correspondence with the National Board in regard to a standard nomenclature of diseases, which need not be reproduced here, as the result was to discover that there is no standard nomenclature.

II. From the Tennessee State Board of Health the following resolutions were received:

OFFICE OF
TENNESSEE STATE BOARD OF HEALTH,
NASHVILLE, April 6, 1881.

WHEREAS, It is believed that public confidence was preserved, and a sense of security engendered throughout the Mississippi Valley, by the operations of the inspection service of the National Board of Heath, during the summer of 1880; and

WHEREAS, It is desirable that such well grounded confidence and security be perpetuated in the interest of commercial and material progress, as well as in "the interest of health and life of the citizens of this State," with the general supervision and protection of which this Board is charged by law: therefore

Be it resolved, That the National Board of Health be, and it is hereby invited to co-operate with and aid the State Board of Health of Tennessee, in the execution and enforcement of its rules and regulations to prevent the introduction of contagious diseases.

Resolved, That in veiw of the increased facilities of communication with the Gulf and South Atlantic ports, the National Board is respectfully requested to advise, promptly, this Board of Health of threatened danger from that source at any time, together with such suggestione connected therewith, as it may be proper to make.

Resolved, That this Board formally approves and endorses the action of the Board of Health of the city of Memphis, as set forth in the following resolutions adopted at a special meeting held on the 29th day of March, 1881, as follows:

"*Resolved*, That the National Board of Health be respectfully requested to place on duty at New Orleans, and with other Southern ports as may be deemed necessary, an inspector or inspectors whose duty it shall be to supervise the shipment by river or rail, of goods, merchandise, baggage, etc., and to advise (cipher telegram) the resident member of the National Board of Health in this city, or in the event of his absence, his official representative, whenever such shipments are believed to be infected, or in anywise dangerous to public health; and that the National Board instruct its resident member to promptly inform this Board of the shipment of such infected or dangerious goods, etc., to this city.

"*Resolved*, That the quarantine grounds and bulidings on President's Island, be again tendered to the National Board of Health for use as an inspection station for the enforcement of the quarantine ordinance of the taxing district, which takes effect May 1st, prox., and for the general purposes of the inspection service of the National Board.

"*Resolved*, That copies of these resolutions and quarantine ordinance be transmitted to the Secretary of the Board of Health in Washington."

Resolved, That the Secretary be, and is hereby instructed to furnish a copy of the above resolutions to the Secretary of the National Board of Health, and the Boards of Health and and Sanitary Council of the Mississippi Valley.

Attest, W. M. CLARK, M. D.,
Secretary State Board of Tennessee.

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To this the following reply was sent:

IOWA STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
DES MOINES, May 18th 1881.

DR. W. M. CLARK, *Secretary Tennessee State Board of Health, Nashville, Tennessee.*

DEAR SIR—Your kind favor of the 11th inst., including resolutions of the Tennessee State Board of Health, came duly to hand. The Iowa State Board of Heath regards it as absolutely essential to the protection of the Valley of the Mississippi from the incursion of epidemic visitations of yellow fever that there should be a cordial co-operation between the National and State Health authorities of the Valley States, and that to the end we regard it as wholly important that the State Boards of the Mississippi Valley should invite the National Board to place its inspectors at such points within their jurisdiction, as in the judgment of the National Board the sanitary interests of the public may require, and that these inspectors should be encouraged by the various State health authorities to make the most thorough investigations of all matters affecting the public health.

Yours truly,

R. J. FARQUHARSON, *Secretary.*

Copies of this were sent to the Tennessee State Board and to the National Board of Health.

III. An extensive correspondence with all the State Boards in regard to the existence or not of laws or regulations in regard to the transportation of corpses, alluded to in previous parts of this report.

IV. A correspondence with Dr. Henry B. Baker, Secretary of the Michigan Board of Health, from whom I received much good advice and instruction in regard to the proper forms to be used in, and the proper mode of compiling vital statistics, for which I would here most sincerely thank Dr. Baker.

V. A correspondence with Dr. Hewitt, Secretary of the Minnesota Board of Health, in regard to an Inter-state Sanitary Conference held at Albert Lea, on August 31st.

As the President, with Drs. Dickinson, Roberts and Hull of the Board were present at this conference, some of them may report the result.

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LEGAL.

The following correspondence explains itself:

STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
DES MOINES, September 7, 1881.

HON. SMITH MCPHERSON, *Attorney-general, Red Oak, Iowa:*

DEAR SIR—At Davenport, recently, a magistrate (Finger) decided that the board of health, composed of the mayor and three aldermen, had no legal existence.

At the trial, a criminal proceeding for disobedience of order of the board of health, the attorney for the defendant (Wm. Lane) read the charter of the city (1851), and moved that the order of the board of health be excluded from the evidence. Are cities under special charter exempt from the action of the Board of Health act (1880)?

Yours truly, R. J. FARQUHARSON, *Secretary.*

STATE OF IOWA,
OFFICE OF THE ATTORNEY-GENERAL,
DES MOINES, September 22, 1881.

R. J. FARQUHARSON, M. D., *Secretary State Board of Health, Des Moines:*

DEAR SIR—Yours of the 6th inst. was mislaid, and thus forgotten.

Without extending my views upon the question, I would say, that in my opinion the Board of Health law, being chapter 151, Eighteenth General Assembly, is applicable to cities organized under special charters.

Yours truly,

S. MCPHERSON, *Attorney-general.*

ADULTERATION OF FOOD.

ATALISSA, IOWA, May 10, 1881.

DR. R. J. FARQUHARSON, *Davenport, Iowa:*

DEAR SIR—What is your opinion of local boards of health examining into and prohibiting the sale of all adulterated food?

Would glucose sugar, and sirup giving sulphuric acid reaction with usual tests, be included with adulterated food?

Also, vinegar made with sulphuric acid?

Please answer as soon as possible, and oblige,

Yours truly,

J. S. TURNER, *Health Officer.*

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IOWA STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
DES MOINES, May 17, 1881.

DR. J. S. TURNER, *Health Officer, Atalissa, Iowa:*

DEAR SIR—Yours of the 10th inst. came duly to hand. Local boards of health should examine into all cases of fraudulent or deleterious adulteration of food, which may occur within their jurisdiction, and should report the results of their examinations to the State Board of Health.

But in regard to legal prosecution, it would be well to proceed very slowly and cautiously, if at all. The only power to punish for adulteration is derived from section 4036, Code of 1873, the act creating the State Board conferring no additional power.

The people must be educated in sanitary matters, and publication of adulterations is oftentimes sufficient for their suppression. But here again, the health officer, or rather the party publishing, if names are used, renders himself open for libel, as recently occurred in Chicago.

The presence of a small quantity of a sulphate in sirup, or in glucose, would give a sulphuric acid reaction, without the presence of any free sulphuric acid.

Vinegar might give the same reaction, and yet be good vinegar.

Perhaps the next legislature may pass a more specific law, accurately defining adulterations; in the meantime it would be well to abstain from legal prosecutions, except, perhaps, in such cases of outrageous and flagrant violations of the law as would render a conviction certain.

Yours truly,

R. J. FARQUHARSON, *Secretary.*

VITAL STATISTICS.

The State Board of Health act has the following title: "An act to establish a State Board of Health in the State of Iowa, to provide for collecting vital statistics, and to assign certain duties to local boards of health, and to punish neglect of duties."

SECTION 11. "It shall be the duty of the Board of Health to make a biennial report, through their Secretary or otherwise, in writing, to the Governor of the State, on or before the first (1st) day of December of each year preceding that in which the General Assembly meets; and such report shall include so much of the proceedings of the Boa.d, such information concerning vital statistics, such knowledge respecting diseases, and such instruction on the subject of hygiene as may be thought useful by the Board, for disseminating among the people, with such suggestions as to legislative action as they may deem necessary."

These evidently impose upon the Board and its Secretary the duty of collecting, compiling, and publishing the vital statistics of the State.

But section 1, chapter 159, laws of 1876, requires all institutions, with a few named exceptions (in which the State Board of Health is not included), to make their reports on or before the first day of November. If the biennial report is to be made on or before November

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1st, and is then to be put into the hands of the public printer, it would be impossible to comply with the requirements of section 11 of the Board of Health Act, which prescribes December 1st as the time for the report.

Again, the report would be made and in press before it would be presented to, read and considered by the Board, which does not meet until in November.

Obviously, either the time of the meeting of the Board must be fixed for an earlier period, say October, or the State Board of Health must be included in the list of exceptions, as is now the case with the Agricultural College and some other State institutions.

To make vital statistics worth compiling and publishing it is very evident that a complete and correct registration of the elements—births, still-births, marriages and deaths, must be made by the clerks of the courts.

Section 3, Board of Health act, should be so amended as to prescribe some penalty for the failure on the part of physicians or midwives to register their names.

Again, in the next to final line of section 3, the word "*and*" should be stricken out, and "*or*" inserted, so as to read "or at such other times as the Board may direct."

If the returns are sent in from the clerks on the 1st of October, it is obvious that many marriages, births and deaths occurring during the month of September will be excluded from the returns, thus rendering the statistics for the year (ending October 1st) imperfect, incorrect, and for compilation valueless, for it is probable that in no two counties in the State would the records include the same amounts of the September events.

There need be no hurry on the part of the clerks in forwarding the returns to this office; it is much more important that the returns be correct than that they should be received at an early period. Indeed, as it will always be impossible to compile the returns of the next preceding year in time for the biennial report, it would make no difference if the returns from the clerks were not sent in before the middle of December; that is to say, that the compilation of vital statistics in the reports will always be one year behindhand.

In connection with the registration of marriages, I would say that in the form (2) for the "Return of a Marriage to County Clerk," in the corresponding column of the Clerk's Record of Marriages (Form 18D), and in the Clerk's Return of Marriages (Form 5C), that the

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word "race" is stricken out. In the first place, it is entirely superfluous, as the nationality or race is sufficiently defined by the "place of birth," and the "color," and its presence in the returns leads to many curious efforts of imagination on the part of the persons filling the returns to define the expression "race," according to his peculiar views in regard to the meaning of that term. The following are a few of the changes rung upon that word "race," culled at random from the records: White; "Caucasian" of various kinds, "light," "blonde," "English" (*i. e.*, American), "Irish" of all counties of Iowa; and of all the States in the Union; "Scotch" of various counties and States; "French" do; "Scotch-Irish" do; "Europeans" of all counties and States; "Anglo-Saxon" do; these all being "Americans." Then we have "Americans" born in Germany, Austria, Holland, etc., this being inexplicable, the birthplace in this instance failing to correct the error. The following tables of the births, still-births, marriages and deaths in the State during that portion of the year (ending October 1st, 1880,) embraced by the returns on file in this office, is given for what it is worth, which is not much, except as a sample of what the vital statistics may be when we have full and correct returns.

As will be seen by referring to the death columns, where the period in days embraced by the report of death for each county is given, the time embraced in no two counties is the same, and, therefore, all comparison being useless, the compilation of tables was not carried beyond those given. The tables as given show the following by counties:

Population: (Census 1880), native, foreign, white, colored, and total.

Marriages: Of whites, of blacks, native or where both parties are Americans; foreign, where both parties are foreigners; mixed, where one is native and the other is foreign; unknown, where the nativity of one or other, or both parties is not stated, and total.

Deaths: Days embraced in the return,—white, colored and unknown; sex, male, female, and unknown; age—those under five years old, those over five; native, foreign and unknown.

Births: White, colored and unknown; sex, male female and unknown; parents, native, foreign, mixed and unknown.

Still-births: White, colored and unknown; sex, male, female and unknown.

The rate of mortality for each county is calculated, from the period embraced in the record, for one year, as so many deaths per thousand of the living population.

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TABLE IV.

Population of Iowa by Counties, United States Census of Iowa.

COUNTIES.	TOTAL.	MALE.	FE-MALE.	NATIVE.	FOR-EIGN.	WHITE.	Colored.*
Adair	11,199	5,971	5,228	10,187	1,012	11,191	8
Adams	11,888	6,364	5,524	10,720	1,168	11,800	88
Allamakee	19,791	10,284	9,502	14,141	5,650	19,754	37
Appanoose	16,636	8,619	8,017	16,123	513	16,563	73
Audubon	7,448	4,035	3,413	6,579	869	7,445	3
Benton	24,888	12,947	11,941	20,959	3,929	24,868	20
Black Hawk	23,913	12,271	11,642	19,986	3,927	23,876	37
Boone	20,838	10,807	10,031	16,732	4,106	20,585	253
Bremer	14,081	7,303	6,778	11,200	2,881	14,073	8
Buchanan	18,547	9,563	8,984	15,786	2,761	18,510	28
Buena Vista	7,537	4,008	3,529	5,772	1,765	7,537	0
Butler	14,293	7,604	6,689	12,043	2,250	14,262	31
Calhoun	5,595	3,002	2,593	4,693	902	5,593	2
Carroll	12,351	6,657	5,694	9,241	3,110	12,341	10
Cass	16,943	9,021	7,922	14,799	2,144	16,923	20
Cedar	18,937	9,805	9,132	16,281	2,656	18,880	57
Cerro Gordo	11,461	6,126	5,335	9,498	1,963	11,438	23
Cherokee	8,240	4,443	3,797	6,695	1,545	8,238	2
Chickasaw	14,534	7,505	7,029	11,559	2,075	14,534	0
Clarke	11,512	5,980	5,532	11,067	445	11,454	58
Clay	4,248	2,284	1,964	3,576	672	4,247	1
Clayton	28,829	14,872	13,957	21,490	7,339	28,828	1
Clinton	36,764	18,939	17,825	26,686	10,078	36,572	192
Crawford	12,413	6,736	5,677	8,938	3,475	12,391	22
Dallas	18,746	9,769	8,977	17,446	1,300	18,692	54
Davis	16,468	8,359	8,109	15,840	628	16,404	64
Decatur	15,336	7,981	7,355	14,810	526	15,208	128
Delaware	17,952	9,246	8,706	14,919	3,033	17,951	1
Des Moines	33,099	16,819	16,280	25,933	7,166	32,649	450
Dickinson	1,901	1,020	881	1,640	261	1,900	1
Dubuque	42,997	21,764	21,233	31,066	11,931	42,838	150
Emmet	1,550	832	718	1,118	432	1,547	3
Fayette	22,258	11,444	10,814	18,688	3,570	22,136	122
Floyd	14,677	7,607	7,070	12,125	2,552	14,672	5
Franklin	10,248	5,452	4,796	8,260	1,988	10,237	11
Fremont	17,653	9,394	8,259	16,721	932	17,589	64
Greene	12,725	6,678	6,047	11,222	1,503	12,709	16
Grundy	12,639	6,944	5,695	9,360	3,279	12,639	0
Guthrie	14,863	7,870	6,993	13,882	981	14,861	2
Hamilton	11,252	5,889	5,363	8,640	2,612	11,251	1
Hancock	3,453	1,924	1,529	2,567	886	3,453	0
Hardin	17,808	9,369	8,439	15,499	2,309	17,697	111
Harrison	16,649	8,859	7,790	15,099	1,550	16,632	17
Henry	20,826	10,633	10,193	18,925	1,901	20,320	506
Howard	10,837	5,742	5,095	8,335	2,502	10,817	20
Humboldt	5,341	2,860	2,481	4,155	1,186	5,337	4
Ida	4,382	2,451	1,931	3,615	767	4,382	0
Iowa	19,221	10,078	9,143	15,153	4,068	19,205	16
Jackson	23,771	12,286	11,485	18,661	5,110	23,762	9
Jasper	25,962	13,446	12,516	23,797	2,165	25,841	121

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TABLE IV—CONTINUED.

COUNTIES.	TOTAL.	MALE.	FEMALE.	NATIVE.	FOREIGN.	WHITE.	Colored.*
Jefferson	17,478	8,868	8,610	15,806	1,672	17,407	71
Johnson	25,429	13,068	12,361	19,874	5,555	25,323	106
Jones	21,052	11,058	9,994	17,841	3,211	21,017	35
Keokuk	21,259	10,826	10,433	19,372	1,887	21,244	15
Kossuth	6,179	3,238	2,941	4,890	1,289	6,178	1
Lee	34,859	17,659	17,200	28,930	5,929	33,211	1,648
Linn	37,235	19,108	18,127	32,006	5,229	37,027	208
Louisa	13,146	6,806	6,340	12,224	922	13,080	66
Lucas	14,530	7,587	6,943	12,966	1,564	14,490	40
Lyon	1,968	1,082	886	1,551	417	1,968	.....
Madison	17,225	8,939	8,286	16,460	765	17,214	11
Mahaska	25,201	12,860	12,341	23,284	1,917	24,690	511
Marion	25,111	12,767	12,344	22,663	2,448	25,067	44
Marshall	23,752	12,267	11,485	20,680	3,072	23,629	123
Mills	14,135	7,646	6,489	12,860	1,275	14,118	17
Mitchell	14,361	7,472	6,889	10,963	3,398	14,356	5
Monona	9,055	4,879	4,176	7,868	1,187	8,966	89
Monroe	13,719	7,270	6,449	12,227	1,492	13,464	255
Montgomery	15,895	8,562	7,333	13,448	2,447	15,782	113
Muscatine	23,168	11,842	11,326	19,192	3,976	22,990	178
O'Brien	4,155	2,235	1,920	3,627	528	4,142	13
Osceola	2,219	1,177	1,042	1,888	331	2,219	.....
Page	19,667	10,458	9,209	17,673	1,994	19,421	246
Palo Alto	4,131	2,203	1,928	3,113	1,018	4,131	.....
Plymouth	8,567	4,639	3,928	6,122	2,445	8,563	4
Pocahontas	3,713	1,924	1,789	2,695	1,018	3,713	.....
Polk	42,395	22,097	20,298	36,166	6,229	41,720	675
Pottawattamie	39,846	22,160	17,686	32,740	7,106	39,228	618
Powesheik	18,936	9,940	8,996	17,015	1,921	18,874	62
Ringgold	12,085	6,418	5,667	11,492	593	12,070	15
Sac	8,774	4,800	3,974	7,138	1,636	8,774	.....
Scott	41,270	21,025	20,245	28,474	12,796	41,005	265
Shelby	12,696	6,952	5,744	10,279	2,417	12,683	13
Soux	5,426	2,978	2,448	3,618	1,808	5,425	1
Story	16,906	8,771	8,135	13,927	2,979	16,897	9
Tama	21,585	11,360	10,225	17,561	4,024	21,172	413
Taylor	15,635	8,242	7,393	14,842	793	15,505	130
Union	14,980	8,105	6,875	13,425	1,555	14,888	92
Van Buren	17,042	8,709	8,333	16,267	775	16,922	120
Wapello	25,282	13,016	12,266	22,680	2,602	24,822	60
Warren	19,578	10,167	9,411	18,636	942	19,515	463
Washington	20,375	10,361	10,014	18,518	1,857	20,280	95
Wayne	16,127	8,337	7,790	15,674	453	16,106	21
Webster	15,950	8,372	7,578	11,730	4,220	15,942	8
Winnebago	4,917	2,620	2,297	2,946	1,947	4,916	1
Winneshiek	23,937	12,303	11,634	16,071	7,866	23,920	17
Woodbury	14,997	8,211	6,786	11,952	3,045	14,789	208
Worth	7,953	4,221	3,732	5,132	2,821	7,944	9
Wright	5,062	2,763	2,229	4,282	780	5,062	.....
	1,624,463	848,235	776,228	1,363,015	261,448	1,614,510	† 9,953

*Including in Bremer county one Indian; in Cedar county four Indians and half-breeds; in Dallas county two Chinese and one Indian; in Fremont county five Indians; in Harrison county four half-breed Indians; in Howard county one Chinese; in Linn county three Chinese; in Marshall county one Chinese and twenty-seven Indians; in Polk county eighteen Chinese; in Wapello county two Chinese; in Winneshiek county two Indians.

†Including forty-seven Chinese and four hundred and sixty-four Indians and half-breeds. For additional details by counties see note above.

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TABLE V—STATEMENT OF DEATHS BY COUNTIES.

Showing; 1, population; 2, total deaths; 3, sex—male, female, unknown; 4, color—white, colored, unknown; 5, nationality—foreign, native, unknown; 6, length of time in report; 7, mortality per 1000; 8, age—over five years, under five years.

COUNTIES.	Population.	Total deaths.	SEX.			COLOR.			NATIONALITY.			LENGTH OF TIME IN THE REPORT.			Mortality per 1,000.	AGE.		
			Male.	Female.	Unknown.	White.	Colored.	Unknown.	Foreign.	Native.	Unknown.	First death.	Last death.	No. of days.		Over five years.	Under five years.	Unknown.
Adair	11,199	16	9	7	....	16	..	...	2	13	1	May 11	September 27	139	3	10	6	....
Adams	11,888	20	7	13	....	20	..	...	0	16	4	June 7	September 29	114	5	10	10	....
Allamakee	19,791	15	6	9	....	15	..	...	3	10	2	June 22	September 21	91	3	9	6	....
Appanoose	16,636	34	19	15	....	34	..	...	0	33	1	June 14	September 23	81	9	15	19	....
Audubon	7,448	19	9	10	....	19	..	...	2	17	..	July 11	September 27	78	10	7	12	...
Benton	24,868	27	17	10	....	27	..	...	3	24	....	July 11	September 23	74	5	11	16	....
Black Hawk	23,913	44	20	23	1	44	..	...	9	29	6	April 22	September 24	149	4	28	16	....
Boone	20,838	45	22	23	....	45	..	...	4	39	2	April 10	September 30	173	4	26	19	....
Bremer	14,081	29	15	14	....	29	..	...	11	18	...	April 30	September 21	144	5	22	7	...
Buchanan	18,547	63	39	24	...	63	..	...	23	39	1	April 24	September 10	139	8	37	26	....
Buena Vista	7,537	3	1	2	....	3	..	...	....	3	....	July 1	August 13	35	3	2	1	....
Butler	14,293	26	17	9	....	25	1	...	5	21	....	April 3	August 28	137	4	11	15	....
Calhoun	5,595	13	8	5	....	13	..	...	1	12	....	August 10	September 28	49	16	7	6	....
Carroll	12,351	10	6	4	....	10	..	..	....	10	....	April 15	August 20	127	2	4	6	....
Cass	16,943	35	18	17	....	35	..	...	2	31	2	July 4	September 30	88	8	20	15	....
Cedar	18,937	41	20	21	....	41	..	...	5	34	2	May 8	September 21	136	5	22	19	....
Cerro Gordo	11,461	32	15	17	....	32	..	...	3	27	2	July 9	September 18	71	14	10	22	....
Cherokee	8,240	10	5	5	....	10	..	...	...	10	....	July 18	September 2	46	9	6	4	....
Chickasaw	14,534	11	5	6	...	11	..	...	1	10	....	July 19	September 4	47	5	6	5	....
Clarke	11,512	23	9	14	....	23	..	...	3	19	1	July 18	September 14	58	12	13	10	...

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Clay	4,248	2	1	1	....	2	..	...	1	1	....	July	21	September	21	62	2	1	1	....		
Clayton	28,829	33	21	12	....	33	..	...	4	29	....	April	4	September	27	176	2	17	16	....		
Clinton	36,764	85	43	42	....	85	..	...	15	68	2	April	25	September	24	152	5	34	47	4		
Crawford	12,413	25	12	13	....	25	..	...	5	20	....	July	8	September	9	63	9	9	16	....		
Dallas	18,746	45	27	18	....	45	..	...	3	38	4	April	17	September	24	160	5	19	26	....		
Davis	16,468	36	24	12	....	36	..	...	1	35	....	July	2	September	30	90	9	18	18	....		
Decatur	15,336	21	9	12	....	21	..	...	....	20	1	July	7	September	25	80	6	12	9	....		
Delaware	17,952	31	21	10	....	31	..	...	2	29	....	July	10	September	22	74	8	15	16	....		
Des Moines	33,099	83	55	28	....	81	2	...	15	63	5	April	19	September	4	138	6	44	37	....		
Dickinson	1,901	5	4	1	...	5	..	...	1	4	....	May	19	August	16	89	10	3	2	....		
Dubuque	42,997	65	32	32	1	62	2	1	24	37	4	July	1	October	22	114	4	43	22	....		
Emmet	1,550	No return.																				
Fayette	22,258	43	23	20	....	43	..	...	5	37	1	April	24	October	21	181	3	24	19	....		
Floyd	14,677	39	24	15	....	39	..	...	6	33	....	April	7	October	5	182	5	28	11	....		
Franklin	10,248	10	4	6	....	10	..	...	....	10	....	July	20	August	18	28	11	1	9	....		
Fremont	17,653	15	8	7	....	15	..	...	1	14	....	May	4	September	8	127	2	5	10	....		
Greene	12,725	23	13	10	....	23	..	...	....	23	....	June	1	September	8	100	6	12	11	....		
Grundy	12,639	39	21	18	....	39	..	...	5	32	2	May	5	September	29	147	7	15	24	....		
Guthrie	14,863	53	20	33	....	53	..	...	....	52	1	May	1	October	6	158	8	20	33	....		
Hamilton	11,252	15	7	8	....	15	..	...	3	12	....	July	23	September	30	69	7	8	7	....		
Hancock	3,453	19	9	10	....	19	..	...	1	17	1	May	27	September	16	122	18	11	8	....		
Hardin	17,808	54	31	23	....	45	5	4	2	52	....	April	20	September	22	156	7	31	23	....		
Harrison	16,649	28	16	12	....	28	..	...	....	28	....	April	16	September	18	165	3	13	15	....		
Henry	20.826	55	35	19	1	49	1	5	13	42	....	April	11	September	21	163	6	41	12	2		
Howard	10,837	15	3	12	....	15	..	...	....	13	2	April	7	September	7	153	3	7	8	....		
Humboldt	5,341	9	4	5	....	9	..	...	....	8	1	July	20	October	13	85	7	6	3	....		
Ida	4,382	15	7	8	....	15	..	...	1	14	...	April	12	September	15	156	8	6	9	....		
Iowa	19,221	22	11	11	....	22	..	...	2	19	1	April	15	September	9	147	2	10	10	2		
Jackson	23,771	31	15	16	....	31	..	...	7	24	....	April	28	September	19	144	3	17	14	....		
Jasper	25,962	27	11	16	....	27	..	...	6	21	....	July	6	September	30	86	4	11	16	....		
Jefferson	17,478	47	24	23	....	45	..	2	5	39	3	June	10	September	16	98	10	27	20	....		
Johnson	25,429	29	14	13	2	29	..	...	10	19	....	July	6	September	28	84	5	16	13	....		
Jones	21,052	20	10	10	....	20	..	...	7	13	....	July	12	September	26	76	4	14	6	....		
Keokuk	21,259	63	29	34	....	63	..	...	3	58	2	April	17	September	16	152	6	26	37	....		
Kossuth	6,179	10	6	4	....	10	..	...	....	10	....	July	12	August	21	71	8	7	3	....		
Lee	34,859	57	27	30	....	49	5	3	16	39	2	June	12	September	21	101	5	36	21	....		
Linn	37,235	20	16	4	....	20	..	...	1	19	....	May	27	September	11	107	1	12	8	....		
Louisa	13,146	43	20	23	....	42	1	...	2	40	1	April	1	September	19	172	7	22	20	1		

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TABLE V.—CONTINUED.

COUNTIES.	Population.	Total deaths.	SEX.			COLOR.			NATIONALITY.			LENGTH OF TIME IN THE REPORT.			Mortality per 1,000.	AGE.		
			Male.	Female.	Unknown.	White.	Colored.	Unknown.	Foreign.	Native.	Unknown.	First Death.	Last death.	No. of days.		Over five years.	Under five years.	Unknown.
Lucas	14,530		....	....	....	....	..	...	...	....	....			....	....	....	....	....
Lyon	1,968	3	2	1	....	3	..	...	....	3	....	April 8	August 12	116	4	3	....	...
Madison	17,225	25	8	17	....	25	..	...	3	22	....	July 6	September 24	80	6	16	9	....
Mahaska	25,201	32	16	16	....	32	..	...	5	22	5	July 10	September 24	76	6	16	16	....
Marion	25,111	50	28	22	....	50	..	...	4	44	2	July 10	September 28	70	9	16	34	....
Marshall	23,752	21	13	8	....	19	..	2	1	14	6	July 10	September 24	76	4	10	11	....
Mills	14,135	17	8	9	....	17	..	...	....	16	1	April 8	September 29	174	2	10	7	....
Mitchell	14,361	19	7	11	1	19	..	...	4	15	....	March 10	September 14	188	2	14	5	....
Monona	9,055	12	6	6	....	12	..	...	....	12	...	July 13	September 18	77	6	3	9	....
Monroe	13,719	36	18	18	....	35	..	1	2	34	...	May 16	September 19	126	7	10	26	...
Montgomery	15,895	41	24	17	....	34	..	7	3	37	1	April 20	September 20	153	5	16	25	....
Muscatine	23,168	77	45	32	..	77	..	...	14	59	4	May 5	October 8	156	6	47	30	....
O'Brien	4,155	10	5	5	....	10	..	...	....	10	....	July 3	September 23	82	11	6	4	....
Osceola	2,219	2	1	1	....	2	..	...	....	2	....	August 18	August 18	1	365	....	2	....
Page	19,667	7	2	5	....	6	1	...	....	7	....	July 25	September 14	51	2	4	3	....
Palo Alto	4,131	11	7	4	....	11	..	...	3	8	....	July 8	September 4	58	17	8	3	....
Plymouth	8,567	15	8	7	...	15	..	...	1	14	....	June 24	September 9	77	7	6	9	....
Pocahontas	3,713	3	3	....	....	3	..	...	....	3	....	August 26	September 10	24	11	2	1	....
Polk	42,395	72	44	27	1	1	1	70	7	65	....	July 1	September 23	85	7	32	40	....
Pottawattamie	39,846	33	18	15	....	32	..	1	2	31	....	July 2	September 19	79	3	14	19	....
Poweshiek	18,936	43	23	20	....	42	..	...	6	37	....	April 13	September 30	170	4	18	25	....
Ringgold	12,085	29	17	12	....	29	..	...	2	27	....	April 2	September 20	171	5	11	18	....
Sac	8,774	2	1	1	....	2	..	...	....	2	....	August 10	October 16	66	1	1	1	....
Scott	41,270	103	53	50	....	97	1	5	23	77	3	April 4	September 22	171	5	50	53	....

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Shelby	12,696	26	13	13	....	26	..	...	2	24	....	April	3	September	24	174	4	17	9	....
Sioux	5,426	4	2	2	....	4	..	...	....	4	....	July	19	August	11	23	12	0	4	....
Story	16,906	14	6	8	....	14	..	...	1	12	1	July	1	September	13	74	4	5	9	....
Tama	21,585	39	16	23	....	38	..	1	6	33	....	April	28	September	28	153	4	20	19	....
Taylor	15,635	23	13	10	....	21	2	...	....	23	....	June	16	September	28	104	5	11	12	....
Union	14,980	13	6	7	....	12	1	...	....	11	2	July	4	August	14	41	7	8	5	....
Van Buren	17,042	29	17	12	....	29	..	...	2	27	....	July	5	September	25	82	6	19	10	....
Wapello	25,282	80	45	35	....	71	1	8	6	73	1	July	5	September	25	112	10	39	41	....
Warren	19,578	51	20	31	....	51	..	...	1	50	....	April	18	September	27	162	6	21	30	....
Washington	20,375	42	26	16	....	42	..	...	6	36	....	May	2	September	18	139	4	28	14	....
Wayne	16,127	39	22	16	1	38	..	1	1	37	1	April	4	September	3	152	5	20	18	....
Webster	15,950	42	22	18	2	40	..	2	5	37	....	June	4	October	19	137	7	22	20	....
Winnebago	4,917	10	5	4	1	9	..	1	2	8	....	June	15	September	10	97	8	5	5	....
Winneshiek	23,937	23	14	9	....	23	..	...	10	13	....	July	1	September	28	89	4	16	7	....
Woodbury	14,997	15	9	6	....	15	..	...	2	12	1	June	20	September	21	93	4	5	10	....
Worth	7,953	4	1	3	....	4	..	...	....	4	....	July	19	August	13	25	7	0	4	....
Wright	5,062	10	8	2	....	10	..	...	....	9	1	July	6	September	29	85	8	8	2	....
Grand Total	1.624,463	2,862	1,519	1,332	11	2,723	24	115	368	2,408	86						5.666	1,465	1,388	9

REMARKS. Total population, 1,624,463; white, 1,614,510; colored, 9,953; males, 848,235; females, 776,228; native, 1.363,015; foreign, 261,448.
Total deaths, 2,862; males, 1,519; females, 1,332; sex unknown, 11; white, 2,723; colored, 24; unknown, 115; native, 2,408; foreign, 368; unknown, 86.
Mean mortality, per annum, per 1,000, calculated, 5.6666; over five years of age, 1,465; under five years of age, 1,388; age unknown, 9.
The low mortality shows that, except in a few rare instances, the total number of deaths is not recorded, even for the short time, embraced in most of the reports.

*Mean 6, excluding Osceola 365.0.

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TABLE VI—STATEMENT OF BIRTHS AND STILL-BIRTHS.

Showing of births; 1, total births; 2, plural births; 3, color—white, colored, unknown; 4, sex—male, female, unknown: births and still-births by counties; 5, parentage—native, foreign, mixed, unknown. Showing of still-births: 1, total still-births; 2, sex—male, female, unknown; 3, color—white, colored, unknown.

COUNTIES.	Total births.	Plural births.	COLOR.			SEX.			PARENTAGE.				Total Still-births.	SEX.			COLOR.		
			White.	Colored.	Unknown.	Male.	Female.	Unknown.	N. N.	F. F.	M.	U.		Male.	Female.	Unknown.	White.	Colored.	Unknown.
Adair	42	..	40	..	2	18	24	..	40	2	..	..	..	..	..	..	..	..	..
Adams	93	4	91	2	.....	46	46	1	82	4	4	3	3	2	1	..	3	..	..
Allamakee	43	..	31	.	12	23	19	1	23	10	9	1	2	1	1	..	2	..	..
Appanoose	91	..	20	1	70	37	52	2	76	5	1	9	2	..	1	1	1	..	1
Audubon	43	2	42	..	1	17	26	..	33	5	4	1	..	..	..	..	..	..	..
Benton	44	..	43	..	1	22	22	..	36	5	1	2	6	5	1	..	6	..	..
Black Hawk (1)	78	2	4	..	74	46	28	4	38	17	15	8	2	1	1	..	..	..	2
Boone	80	2	69	..	11	35	45	..	60	7	11	2	1	1	..	..	1	..	..
Bremer	57	..	57	..	.....	23	33	1	45	6	6	..	4	1	2	1	4	..	..
Buchanan	88	2	88	..	.....	46	42	..	61	15	6	6	6	2	2	2	4	..	2
Buena Vista	27	..	27	..	.....	16	11	..	16	4	6	1	2	1	1	..	2	..	..
Butler (2)	47	..	31	..	16	24	23	..	28	8	7	4	4	3	1	..	3	..	1
Calhoun	12	..	11	..	1	5	7	.	9	..	3	..	..	..	..	..	..	..	..
Carroll (3)	27	..	27	..	.....	13	14	..	17	7	1	2	1	..	..	1	1	..	..
Cass	85	..	85	..	.....	42	39	4	71	10	4	0	5	3	2	..	5	..	..
Cedar	117	..	12	..	105	69	47	1	69	26	13	9	3	2	1	..	3	..	..
Cerro Gordo	75	..	74	..	1	36	39	..	50	11	12	2	2	1	1	..	2	..	..
Cherokee	14	..	14	..	.....	7	7	..	9	2	3	..	..	..	..	..	..	..	..
Chickasaw	25	..	1	..	24	18	7	..	14	5	3	3	..	..	..	..	..	..	..
Clarke	49	..	49	..	.....	17	32	..	47	1	1	..	6	1	4	1	4	..	2

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TABLE VI—CONTINUED.

COUNTIES.	Total births.	Plural births.	COLOR.			SEX.			PARENTAGE.				Total still-births.	SEX.			COLOR.		
			White.	Colored.	Unknown.	Male.	Female.	Unknown.	N. N.	F. F.	M.	U.		Male.	Female.	Unknown.	White.	Colored.	Unknown.
Lucas (no report)	...	....	...	..	....	...	...	..	...	...	...	...	..	...	...	..	...	..	..
Lyon	8	....	8	..	....	2	6	..	6	1	1	...	0	...	...	..	...	..	..
Madison	84	2	84	..	....	42	42	..	76	4	4	...	3	1	2	..	3	..	..
Mahaska	73	....	0	1	72	38	33	2	56	7	3	7	6	3	1	2	5	..	1
Marion	128	4	128	..	....	66	61	1	98	17	10	3	5	5	...	..	5	..	..
Marshall	61	8	...	..	61	29	25	7	44	6	2	9	7	4	2	1	6	..	1
Mills	51	....	51	..	....	30	21	..	42	4	5	...	0	...	...	..	...	..	..
Mitchell	51	...	49	..	2	27	24	..	30	13	4	4	6	2	3	1	6	..	..
Monona	20	....	14	..	6	12	8	..	18	...	2	...	1	...	1	..	1	..	..
Monroe	86	4	85	1	....	44	42	..	68	7	5	6	2	2	...	..	2	..	..
Montgomery	78	....	26	..	52	36	40	2	63	4	7	4	4	1	2	1	4	..	..
Muscatine	172	....	167	1	4	94	73	5	110	31	24	7	0	...	...	..	...	..	..
O'Brien	7	....	7	..	....	3	4	..	3	2	2	...	1	1	...	..	1	..	..
Osceola	3	....	2	..	1	1	2	..	3	...	...	...	1	...	1	..	1	..	..
Page	43	....	1	2	40	21	22	..	38	2	2	1	2	2	...	..	1	1	..
Palo Alto	16	....	1	..	15	8	8	..	11	1	4	...	1	...	1	..	1	..	..
Plymouth	25	....	25	..	....	17	8	..	14	8	3	...	3	1	2	..	3	..	..
Pocahontas	7	....	6	..	1	3	4	..	3	3	1	...	0	...	...	..	...	..	..
Polk	164	....	2	1	161	88	74	2	117	31	13	3	14	4	7	3	1	2	11
Pottawattamie	83	2	....	3	80	42	37	4	46	22	13	2	4	2	2	..	4	..	..
Poweshiek	110	6	109	1	....	47	59	4	88	12	8	2	8	6	2	..	8	..	..
Ringgold	93	4	93	..	....	45	48	..	88	...	4	1	4	1	3	..	4	..	..
Sac	3	....	3	..	....	1	2	..	1	2	...	...	2	1	...	1	1	..	1
Scott	255	4	....	..	255	126	127	2	66	127	60	2	8	5	3	..	8	..	..

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Shelby	87	....	87	..	....	37	50	..	63	14	7	3	4	1	3	..	4	..	..
Sioux	50	2	9	..	41	27	23	..	11	26	13	...	0	...	...	..	...	..	..
Story	41	....	38	..	3	21	18	2	27	5	6	3	0	...	...	..	...	..	..
Tama	80	....	80	..	....	38	41	1	66	10	4	0	2	1	...	1	1	..	1
Taylor	42	....	41	1	....	16	26	..	39	..	3	...	6	4	1	1	5	..	1
Union	32	2	32	..	....	16	16	..	22	2	6	2	2	...	2	..	2	..	..
Van Buren	91	....	90	1	....	41	50	..	84	...	5	2	0	...	...	..	...	..	..
Wapello	180	....	11	4	165	76	103	1	141	18	20	1	*8	1	6	1	6	..	2
Warren	164	8	....	2	162	77	86	1	147	6	5	6	10	1	8	1	10	..	..
Washington	87	....	86	..	1	53	34	..	68	8	6	5	4	4	...	..	4	..	..
Wayne	110	2	110	..	..	63	47	..	89	3	2	16	3	2	1	..	3	..	..
Webster	78	....	78	..	....	39	39	..	43	22	9	4	7	6	...	1	6	..	1
Winnebago	19	2	19	..	....	11	8	..	6	9	4	...	0	...	...	..	...	..	..
Winneshiek	48	....	35	..	13	21	27	..	31	7	10	...	3	2	1	..	3	..	..
Woodbury	16	....	1	..	15	10	6	..	11	3	2	...	1	1	...	..	1	..	..
Worth	13	....	13	..	...	10	3	..	79	2	4	...	0	...	...	..	...	..	..
Wright	15	....	15	..	....	10	5	..	9	3	3	...	1	1	...	..	1	..	..
Grand total	6,305	114	4,102	28	2,175	3,153	3,078	74	4,537	876	649	243	290	149	115	26	251	6	33

REMARKS.—(1) In this county two illegitimate births are recorded.

(2) The number of foreign births is here, as elsewhere, increased by the entry of "English," no birth-place being given; "English" meaning "American," or native of United States.

(3) The births from foreign parentage is here, as elsewhere, increased by the use of the term "German," without any birth-place, meaning a native of German descent, or one having a German name.

(4) In this county two "bastards" are recorded. Total births, 6,305; plural births (twins), 114; white births, 4,102; colored births, 28; unknown, 2,175; male births, 3,153; female births, 3,078; unknown sex, 74; births of N. N. parents, 4,537; births of F. F. parents, 876; births of M. parents, 649; births of V. parents, 243.

(5) Scott county has a large foreign population, but the foreign parentage is undoubtedly swelled in the record by the use of the term "German," without a birth-place, meaning generally "American."

(6) Twin females; total still-births, 290; males, 149; females, 115; sex unknown, 26; white still-births, 251; colored, 6; color unknown, 33.

N. N.—Both parents native.

F. F.—Both parents foreign.

M.—Mixed; *i. e.*, one parent foreign and the other native.

V.—Unknown; one or both parents unknown.

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TABLE VII—MARRIAGES BY COUNTIES.

Showing, 1; total marriages; 2, color—white, colored, unknown; 3, nationality of parties married—native, foreign, mixed, unknown.

COUNTIES.	Total marriages.	COLOR.			NATIONALITY.			
		White.	Colored.	Unknown.	N. N.*	F. F.†	M.‡	U.S
Adair	18	18	..	...	14	...	3	1
Adams (1)	22	22	..	...	17	...	4	1
Allamakee	22	21	1	...	16	...	4	2
Appanoose	31	31	..	...	25	1	4	1
Audubon	17	17	..	...	16	1	...	...
Benton	8	8	..	...	5	2	...	1
Black Hawk	10	10	..	...	8	...	2	...
Boone	42	41	1	...	23	10	7	2
Bremer	14	14	..	...	14	...	...	...
Buchanan	61	61	..	...	16	...	2	43
Buena Vista	6	6	..	...	4	2	...	...
Butler	16	16	..	...	14	...	2	...
Calhoun	5	5	..	...	5	...	...	...
Carroll	41	41	..	...	18	2	6	15
Cass, no report								
Cedar	24	24	..	...	17	...	4	3
Cerro Gordo	9	9	..	...	7	2	...	...
Cherokee	6	6	..	...	3	1	2	...
Chickasaw, no report								
Clarke	12	12	..	...	11	...	...	1
Clay	6	6	..	...	2	...	...	4
Clayton	17	17	..	...	10	4	1	2
Clinton	33	33	..	...	16	11	5	1
Crawford	9	9	..	...	5	2	2	...
Dallas	15	15	..	...	15	...	...	...
Davis	19	19	..	...	19	...	...	...
Decatur	31	30	1	...	29	...	2	...
Delaware	26	26	..	...	23	1	2	...
Des Moines	38	36	2	...	19	11	6	2
Dickinson, no report								
Dubuque (2)	327	18	1	308	6	3	4	314
Emmet, no report								
Fayette	37	36	1	...	23	1	2	11
Floyd	32	32	..	...	21	5	6	...
Franklin	8	8	..	...	5	1	2	...
Fremont	18	18	..	...	13	...	1	4
Greene	15	15	..	...	12	...	2	1
Grundy	19	19	..	...	10	5	3	1
Guthrie	23	23	..	...	21	1	1	...

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TABLE VII—CONTINUED.

COUNTIES.	Total marriages.	COLOR.			NATIONALITY.			
		White.	Colored.	Unknown.	N. N.*	F. F.†	M.‖	U.S.
Hamilton	10	10	..	...	7	2	1	...
Hancock	6	6	..	...	4	2	...	...
Hardin	33	33	..	...	26	1	2	4
Harrison	13	13	..	...	13	...	...	...
Henry	25	25	..	...	21	...	2	2
Howard	7	7	..	...	4	...	3	...
Humboldt	5	5	..	...	2	...	3	...
Ida	14	14	..	...	11	1	2	...
Iowa	22	22	..	...	16	5	1	...
Jackson	13	13	..	...	9	1	1	2
Jasper	53	52	1	...	28	5	3	17
Jefferson	30	30	..	...	22	4	4	...
Johnson	53	52	1	...	15	3	5	30
Jones	17	17	..	...	10	2	...	5
Keokuk	23	23	..	...	20	...	1	2
Kossuth	6	6	..	...	5	...	...	1
Lee	26	26	..	...	20	3	3	...
Linn	35	34	1	...	26	5	4	...
Louisa	14	14	..	...	12	...	1	1
Lucas, no report								
Lyon	4	4	..	...	3	1	...	...
Madison	24	24	..	...	21	...	...	3
Mahaska	40	36	4	...	35	...	2	3
Marion	17	17	..	...	13	2	2	...
Marshall	44	44	..	...	26	4	5	9
Mills	17	17	..	...	13	2	1	1
Mitchell	8	8	..	...	6	1	1	...
Monona	18	18	..	...	13	1	4	...
Monroe	37	36	1	...	33	2	2	...
Montgomery	17	16	1	...	9	3	3	2
Muscatine	32	32	..	...	26	1	1	4
O'Brien	6	6	..	...	2	...	2	2
Osceola	1	1	..	...	1	...	...	...
Page, no report								
Palo Alto	1	1	..	...	1	...	...	...
Plymouth	8	8	..	...	4	1	2	1
Pocahontas, no report								
Polk	123	123	..	...	42	7	5	69
Pottawattamie	78	78	..	...	41	7	7	23
Poweshiek	12	12	..	...	9	1	2	...
Ringgold	18	18	..	...	17	...	1	...
Sac	4	4	..	...	3	...	1	...
Scott	49	46	3	...	30	11	8	...
Shelby	23	23	..	...	15	4	4	...
Sioux	6	6	..	...	1	2	3	...
Story	31	31	..	...	23	4	3	1
Tama	20	20	..	...	17	2	1	...
Taylor	17	17	..	...	16	...	1	...
Union	17	16	1	...	13	...	1	3
Van Buren	6	6	..	...	5	...	1	...
Wapello	58	57	1	...	39	2	7	10

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TABLE VII.—CONTINUED.

COUNTIES.	Total marriages.	COLOR.			NATIONALITY.			
		White.	Colored.	Unknown.	N. N.*	F. F.†	M.‖	U.§
Warren	32	32	..	...	31	...	1	...
Washington	17	17	..	...	13	2	2	...
Wayne	15	15	..	...	12	...	2	1
Webster	24	24	..	...	11	8	5	...
Winnebago	9	9	..	...	5	1	3	...
Winneshiek	18	18	..	...	11	2	3	2
Woodbury	19	19	..	...	12	4	3	...
Worth	4	4	..	...	1	1	...	2
Wright	2	2	..	...	2	...	...	...
Grand total	2,318	1,989	21	308	1,323	176	204	610

(1.) In Adams county is recorded the marriage of a white man with a woman "designated as nearly white."

Total marriages, 2,318; marriages of whites, 1,989; marriages of colored, 21; total, 1,318.

†N. N. marriages, 1,323; ‡F. F. marriages, 176; ‖M. marriages, 204; V. unknown, 610; total, 2,318.

(2.) This report covers one year, but is very incomplete, as is seen.

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ILLUMINATING OILS.

Every reader of the daily papers must be struck with the great frequency of accidents, from coal oil in this state; deaths (after most horrid suffering), from this cause are fully as frequent as those from lightning stroke, yet they do not appear to excite the same amount of attention, or publicity.

Though only in part insuring the safety of mankind, properly constructed lightning-rods assure almost complete protection to property, and in like manner laws properly prepared, in regard to the inspection and sale of illuminating oils, would procure as great if not greater immunity to womankind (who are almost the sole sufferers from coal oil accidents), from the dangers incident to the domestic use of kerosene. No one who is aware of the history of the subject in Michigan, where, by the enforcement of judicious inspection of coal oils, the frequency of accidents from their use was reduced from what it is now in this and other States without inspection laws, to a state of almost complete immunity from accident.

This State is mentioned as one without an inspection law, and such is virtually the case, for the law is not enforced, and remains a dead-letter, and like all such laws does private injury. It is easy enough by comparison of the laws of the two States to see why ours is a failure. The Michigan law is mandatory, and uses the term "shall," while that of Iowa is permissive, and employs the term "may."

Again, the Michigan law allows to the inspectors the following scale of renumeration: Forty cents single barrel, on five or less; twenty-five cents on ten or less, and ten cents on each additional barrel over ten, while the Iowa law allows but five cents per package, at which rate, considering the time required for each test, no one could earn his salt.

Both laws are defective, in not prescribing the form of apparatus to be used by the inspector; in Michigan this fault is corrected by the inspectors using the apparatus recommended by the State Board of Health; any one aware of the uncertainty of many modes of testing, especially any one who has witnessed the feat of an itinerant vender of some terribly explosive oil, in plunging a lighted match into the same with impunity, must be aware of the need of prescribing the use of some good and approved apparatus for the inspection of oils.

My attention was recently and forcibly called to the condition of the law in this State by a letter of inquiry from Prof. Elliot, of the

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Columbia School of Mines, to whom the subject of coal oils had been assigned by the New York State Board of Health, asking for information in regard to the law in this State and its action.

EXPENDITURE.

The expenditures of the office since May 5th, up to October 1st, are included in the report of Mr. Andrews.

All of which is respectfully submitted by

Your obedient servant,

R. J. FARQUHARSON, *Secretary.*

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WATER SUPPLY,

AND ITS

Relation to Health and Disease.

BY

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MEMBER OF THE

STATE BOARD OF HEALTH,

AND

CHAIRMAN OF STANDING COMMITTEE ON FOOD, DRINKS, AND WATER SUPPLY.

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WATER SUPPLY.

FROM the earliest times an abundance of pure water has been regarded by mankind as one of the most desirable of blessings. When men, in the progress of civilization, began to mass themselves together in cities, one of the problems which early demanded consideration was, how to supply themselves with pure water.

There were various sources of supply—from wells, from streams, and from rain-water stored in cisterns. Some cities, like Rome, undertook gigantic hydraulic works, building magnificent aqueducts to conduct the water from distant sources of supply into the imperial city. Jerusalem constructed vast cisterns hewed out of the solid rock, and filled them by subterranean conduits leading outside the walls of the city. The great importance of pure drinking water as a factor in the preservation of health is becoming more and more recognized by scientists and medical men. It is now generally conceded that impurities in water are more potent in the origin and spread of disease than any other cause, and that the germs of many of the more fatal forms of disease are introduced into the system by means of water. Epidemics of zymotic disease, as typhoid fever and diphtheritis, have so frequently been proved to have arisen from the use of contaminated water, that there is no question as to its influence. This is abundantly shown in the fact that so soon as the cause is removed the disease has abated. It is true that this class of diseases arises from other causes, but the use of impure water is one of the most frequent. It is asserted by some writers who deny the connection between the use of polluted water and the increase of disease that water known to be very impure has been used for years with immunity from any zymotic disease. Although much has been said *pro* and *con*, it is undoubtedly true that the weight of evidence favors the theory that polluted water may, and does, become the cause of disease, and therefore the great importance which writers on sanitary science attach to the subject, and the importance of educating the public to right views and practices concerning their water supply.

SOURCES OF SUPPLY.

There are five sources of supply; namely, springs, streams and lakes, rain-water, and wells, each possessing different degrees of purity,

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They are the natural drains of the territory through which they pass, receiving not only the rain-fall, but also all organic and inorganic matter washed into them by a thousand tributaries. After rains they become turbid with earth. They are the receptacles of all the waste products of the inhabitants of the district; they receive the contents of sewers, cess-pools and privies; the offal of distilleries, slaughter-houses and tanneries, and the refuse of factories. Into them are thrown carcasses of dead animals as the most expeditious method of burial. From swamps they receive the matter of vegetable decomposition, and are discolored by flowing over beds of peat. In the West the evil is not so serious on account of the low percentage of population to area, but some of our streams are beginning to show the effects of increasing population, and especially in the growth of towns of considerable size upon their banks. In the more densely populated districts of our Eastern States, and especially in parts of Europe, many of the streams are already hopelessly polluted, and the subject is eliciting the anxious consideration of sanitarians.

It is certain that until some method can be devised to utilize sewage, the offal and refuse of manufactories, slaughter-houses, and distilleries, streams must be the channels through which waste products may escape.

The objections to the use of the water of streams as a beverage are: the high temperature; its occasional turbid condition after excessive rains; and the great liability to contamination from organic matter and waste products of factories. From the difficulty of supplying large cities from any other source the question resolves itself into the problem of how to secure, under these unfavorable conditions, an adequate supply of wholesome water.

CHARACTERISTICS OF GOOD POTABLE WATER.

Absolutely pure water for domestic use is seldom to be obtained, and even if it could be, is hardly to be desired. Distilled water is unpalatable, having a flat, insipid taste. Indeed, water to be pleasant to the taste must contain in solution certain gases; and is not rendered unpalatable nor unwholesome by the admixture of mineral substances, unless these are in excessive quantity.

Waters which flow over or through granite and gneiss formations, are the purest, yet even these dissolve some mineral substances. The most common of these are the chlorides, sulphates, and carbonates of sodium, potassium, magnesium, and calcium, together with silica and

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and of various degrees of abundance. In regard to purity they rank as follows:

1. Springs.
2. Deep wells.
3. Rain-water.
4. Shallow wells.
5. Streams and lakes.

Springs found in suitable localities, and furnishing an abundance of water, are very satisfactory sources of supply. Their advantages are a uniform temperature, and freedom from contamination. Their disadvantages are, their liability to contain in solution an objectionable quantity of substances; as iron, sulphur, salt, etc. When furnishing a large amount of water they can be used to supply numbers of families by conducting the water through pipes to the places of consumption.

Wells are of two kinds—deep and shallow. The first furnishes the purer water, to reach which it is generally necessary to bore through impervious clay. The water is, therefore, thoroughly filtrated in passing from the surface of the ground to the spot reached by the shaft. If too deep, however, as in the case of artesian wells, the water is liable to contain an exess of inorganic matter; as salts of magnesia and lime. Shallow wells, if favorably situated, usually furnish reasonably pure water; but unless care is taken in the selection of the site they will become polluted by organic matter, finding entrance by soil saturation, from surface drainage, or through fissures in the strata of the ground.

It would be commonly supposed that rain-water collected in clean cisterns from well washed roofs would fill all the conditions of purity and wholesomeness; and it would do so were it collected at a distance from towns and villages. But rain-water collected in towns is far from pure. The water in falling carries with it many gaseous and solid substances with which the atmosphere is loaded. Roofs of houses are covered with dust, excrement of birds, fungus growths; and it is impossible, without the most vigilant care, to prevent these impurities from being carried with the water into the cisterns in objectionable quantities. It is asserted, also, with good show of reason, that the softness of the water, though admirable for cleansing processes, unfits it for drinking purposes because the structures of the body are largely supplied from the mineral constituents of water.

Streams and lakes or ponds are placed last for several reasons.

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aluminum. Iron is the metal most frequently found. To the presence of these minerals is due that quality of water called hardness. For cleansing purposes it is objectionable; but it is an open question, whether hard or soft water is most beneficial to health. Nearly all water contains, also in solution, more or less of vegetable organic matter, due to the action of water on the vegetable matter over which it flows, or to vegetable growths which live and die in the water itself. Water flowing through peat formation is often highly colored, but is not, on this account, considered unwholesome. It is well known that water of this character is often selected for ocean voyages, on account of its power of retaining its freshness for long periods. In England and Ireland, bog-water is held in high repute for its excellence. So it will be seen that water need by no means be pure to be considered potable. Many of the substances held in solution by water can hardly be regarded as impurities, and their presence, or absence, does not affect the health of the consumer. What, then, shall be regarded as constituting pollution of water?

As has been already remarked, it is difficult to find water entirely free from organic matters; and when these are present to only a slight extent, they do not affect to any appreciable degree the quality. If, however, the organic matter held in solution in water exceeds a certain proportion, it becomes injurious to health, and in still greater quantity, dangerous to life. Of organic matter, the first in point of virulence are the dejections from human sources; and the most virulent of all are those from persons sick with zymotic disease. It has been well established that these diseases are communicated from the dejections of the sick finding their way into the stomach of the well. That water polluted with excrementitious matter alone can originate these diseases has been a matter of controversy, but that water polluted with execrementitious matter from persons sick with certain forms of disease will induce the same diseases, is a fact well established.

It has been argued by high authority that the reason of danger from organic pollution is, not that organic matter is harmful in itself, but that it serves as points of attachment and propagation of germs of septic diseases, and wherever there is organic pollution there also is danger of the presence of zymotic germs.

Second in point of danger is pollution from offal of slaughter-houses, and the refuse of tanneries.

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Third, excrementitious matter from domestic animals; and lastly, from vegetable organic matter.

If the presence of decaying products from vegetation poisons the air, and causes malarious diseases, it would seem equally probable that their presence in excessive quantity in water used for drinking would give rise to the same evil.

Turbidity of water by itself can hardly be considered injurious to health, unless the quantity of earth held in suspension be considerable, and consists of clay, in which case constant use may bring on intestinal disturbances and indigestion. Turbid water, however, is liable to contain organic matter in excess, and hence due caution should be observed in its use.

We come now to the methods of preventing contamination of water and of removing impurities when present.

RAIN-WATER.

In many towns of small size, where it is impracticable to build water-works, on account of the expense, or the remoteness of the supply; and when well water contains an excessive quantity of mineral substances, and especially the salts of magnesia, many are driven to depend upon rain-water for domestic use. In the country, where the air is pure, and little dust, it is generally only necessary to cleanse the cistern once or twice a year to ensure sufficient purity in the water, but in towns, as we have already shown, there are many causes of contamination. A great many devices have been adopted to render the rain-water fit for use. The first to suggest itself, is to allow the first flow to escape, until the air, roofs, and pipes are thoroughly cleansed, and not until then allow the water to flow into the cistern. This would necessitate the use of self-acting valves, or of constant surveillance, both of which have been proven to be impracticable.

Another way is to cause the water to flow through walls, or obstructions which should remove objectionable matter, and render the water fit for use. A great variety of materials have been used for the purpose; as brick, porous tiles, vegetable and animal charcoal, compressed sponge, unglazed earthen-ware, sandstone, and spongy iron. Of all these, only two can be relied upon to any extent to remove or destroy organic material; namely, animal charcoal and spongy iron. The only objection to the latter is, that the water becomes more or less impregnated with the iron. One common method is to build a cylinder of brick in the center of the cistern, the water filtering through in suffi-

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cient quantity; another, to divide the cistern into two divisions by a brick partition. Sandstone or porous tile may be used for the same purpose. The objections to all these materials are, that they soon become clogged and covered on the outside with a deposit of decaying organic matter, through which the water must pass to reach the inner chamber, and which must necessarily communicate some offensive property to it, or the water is arrested in its passage and the supply ceases. This is the most fortunate result, for it calls attention to the condition of the filter and necessitates removal or cleansing. It is also doubtful if these materials destroy organic matter.

Repeated experiments have shown that the best material for a filter is animal charcoal, used either in blocks or granulated. It has been demonstrated that this material destroys and removes organic matter. Blocks of the animal charcoal may be built up in cylinders, or partitions. A recent device is to attach the filtering box by coupling to the suction pipe of the pump, by which means it may readily be removed for cleansing or renewal. Whichever form of filter is used, it is advisable that it be thoroughly cleansed or renewed once in six or twelve months.

PURIFICATION OF WELLS.

As a large proportion of our population are dependent on wells for water supply, it is of the highest importance that they should learn the danger of pollution, and the most effectual methods of preventing it. We read in our journals of whole families dying in farm-houses of diphtheria, and the community wonders at the cause. Possibly no other cases occur in the neighborhood. With pure water, and pure air, these deaths would not have occurred. I do not think that men willfully disregard the laws of health, but they ignorantly violate these laws, and suffer the penalties of sickness and death.

I have placed wells as the second best source of supply, as regards freedom from organic pollution, when made with due regard to situation and surroundings.

Wells are of three varieties:

First—Those which are dug through deposits of soil, sand, and pervious gravel, until they reach a stratum of impervious clay.

Second—Those which penetrate the first stratum of clay, and passing through a bed of gravel or sand beneath the clay, reach another stratum of clay. These we may class deep wells, the first variety being entitled shallow wells.

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Third—Artesian wells, penetrating the earth to considerable depth.

In wells of the first kind, the supply of water may at first be clear, bright, and sparkling, and reasonably pure. It undergoes a process of filtration, oxidation (because porous soil contains considerable air), and sedimentation, the earthy and organic matters being filtered out and destroyed in the slow passage of the water to the water-level of the well. But the householder is generally guided only by convenience in the location of his well. It is usually in the rear of the dwelling, in close proximity to the kitchen. The barn, the privy, and the cess-pool, if such there be, are also conveniently located near the house, and also near the well. Generally, no regard is taken of the slope of the barnyard or of the direction of the stratum of clay upon which the well rests. Excrementitious matter from the barnyard, or the refuse of the kitchen are washed into it; the contents of the cess-pool or privy gradually saturate the soil in an ever-increasing area, until they reach the well. It is not necessary to the contamination of the water that the area of soil saturation should reach the well. As water is drawn from the well, there is a movement of the water in the surrounding soil to fill up the void, therefore surface water passing through the area saturated with the organic matter will dissolve this matter and carry it into the well. After heavy rains it has been noticed that the water of shallow wells is more than ordinarily impure. In towns and villages, the probability of pollution is much increased, owing to the greater contiguity of cess-pools and privies to the well, and the greater quantity of refuse matter upon the surface.

WHAT ARE THE REMEDIES?

First—To lay the upper part of the well in cement, so as to exclude surface drainage.

Second—To pay due regard to the slope of the impervious bed, so that the direction of the underground flow should not be from the privy and barnyard toward the well.

Third—To place privies, cess-pools, etc., at a sufficient distance (not less than one hundred feet) from the well, so that if any organic matter reaches the well it will be so much diluted as to be innoxious.

Another means of safety is frequent cleansing of privy vaults and cess-pools, and disinfection of their contents. Slops should not be thrown near the well.

The question will be asked: What distance from deposits of filth

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should the well be placed to insure non-pollution? It depends somewhat on the nature of the soil, and the direction of the impervious stratum beneath. Instances, well authenticated, are reported of the contents of privy vaults polluting wells situated a hundred feet from them. Usually, however, a distance of sixty or seventy feet insures non-pollution.

The water of deep wells, or such as derive their supply from underneath an impervious stratum of clay, and which penetrate a water-bearing bed of gravel or sand—this kind of well is less liable to contamination than the first, because it usually derives its supply of water from a distance, provided the surface, or ground water, does not obtain entrance. If the surface soil is clay, no precautions are necessary, except to raise the mouth of the well above the surrounding level. But if the well is first sunk through sand, or gravel, the wall should be well laid in cement above the first seam of clay. Occasionally, however, there is danger of organic matter reaching the well through fissures in the clay, and especially the kind known as joint clay. If this is suspected, the privy, or cess-pool, from which the filth comes, should be removed to a greater distance, and in a different direction from the well.

A new method which obviates many of the ordinary risks of pollution is called the drive-well system, familiar to every person in the Western States. The pipe being impervious to water, except at its lower end, no impurities can find entrance, save such as are present in the water-bearing stratum to which it penetrates. If sunk through surface sand, or gravel, to the first layer of clay, the water is equally liable to contamination, except from surface drainage.

A system for supplying water to towns of moderate size, situated on the margins of streams and ponds, has been practiced in Europe, and to some extent in this country. This consists in sinking one or more large wells near the bank of the stream, or pond. These wells are not supplied, as might be supposed, from the river or lake, as experiment has proved that the water will not filter through the bank in sufficient quantity, and attempts to obtain a sufficient supply from this source have proved a failure. Where, in the vicinity of a river or pond there is a sufficiently pervious soil, and especially where the land rises gradually from the river there is a body of ground-water moving slowly, and regularly, to the bed of the stream—if a well is sunk into this water-bearing soil, it intercepts and receives a portion of the water. A sufficient number of them, connected by galleries,

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would undoubtedly furnish a large quantity of water. The quantity would be affected, however, by the porousness of the soil, its angle of declivity, and the amount of rain-fall. To supply a town from this source, the minimum amount entering the wells can only safely be calculated on. A well of this kind, sunk on the banks of the Elbe, where the soil was very porous, furnished 600,000 gallons every twenty-four hours. The pumping was so conducted as to keep the water in the well eight feet below its normal level.

The question has been raised whether the supply for the city of Des Moines could not be furnished from large pits sunk near the banks of the river, under the supposition that sufficient water would pass from the river into them to supply the city, but experiments of this kind, as before stated, have proved a failure. It is possible, however, that a sufficient quantity could be furnished from the ground-water moving toward the Raccoon River from the heights and along the bottom-lands. Waltham and Cambridge, in Massachusetts; Toulouse, Lyons, Nevers, and Blois, in France; and Dresden, in Saxony, are supplied in this manner. The water collected in this manner, or by natural filtration, as it has been termed, is generally harder than river water, but more free from organic matter; yet if this ground-water passes under a densely populated neighborhood, it is liable to pollution from percolation from privies, cess-pools, and other collections of filth existing in said locality.

RIVERS AND LAKES.

We come now to the examination of the water of rivers and lakes, and especially of the first named, as the source of water supply. Many of the large towns of this State derive their supply of water from this source, or are preparing to do so. Are the waters of our rivers of sufficient purity, when taken directly from them, to be healthful? or do they need some method of purification to render them fit for use? I have already stated the causes of pollution of river water. Many of these are not as operative in our State as in some others; yet, with the rapid increase in the number of slaughter-houses, soap manufactories, rendering establishments, and sewerage from large towns, the danger is increasing yearly. The source of pollution is also a most dangerous one; namely, animal organic matter, a large proportion of which is in process of decomposition. A very small quantity of this matter in water renders it inimical to health.

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SELF-PURIFICATION.

There are three modes of self-purification of river water; namely, sedimentation, dilution, and oxidation. In addition, a certain amount of animal matter is consumed by fishes; a favorite place of resort for them being at the mouths of sewers. Aquatic plants also take up and assimilate considerable portions of organic matter.

SEDIMENTATION OR DEPOSITION.

Much of the waste matter thrown in streams is insoluble in water, and either sinks to the bottom, or is deposited on, or along the banks. Earths held in suspension are disposed of in this manner, so that a stream which is very turbid after heavy rains, soon becomes clear.

DILUTION.

This mode of self-purification is the diffusion of waste and excrementitious matter through the large mass of water, to such an extent that it becomes inappreciable to chemical tests. Sewerage, animal and vegetable matter, waste from factories, coloring matter from dye houses poured into rivers in quantities sufficient to render the water wholly unfit for use, are in the course of a few miles so largely diluted as to be probably innoxious. I say probably, for the reason that sanitary science has not yet determined to what extent polluted water must be diluted to render it fit to drink. Although a certain proportion of organic matter is destroyed by contact with air and light, and is consumed by fishes and plants, yet more or less still remains in the water for an indeterminate period.

OXIDATION.

It is undoubtedly true that in running streams, organic matter of certain kinds decomposes rapidly, and changes into harmless substances. Others are less easily decomposed, as muscular fibre, which may remain for months in water and still be recognizable under the microscope.

All water holds a certain amount of air, and in swift running streams the water is pretty thoroughly mixed with the air, and its oxygen unites with the organic matter in the stream, forming new combinations of nitrates, nitrites, and carbonic acid. Many examinations of the waters of streams have been made with a view to determine the degree of purification within a certain distance from the source of pollution. This largely depends upon the width, depth,

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velocity of current, number and size of affluents, rain-fall, etc. The Mississippi would so quickly dilute and oxidize the sewage and excrementitious matters discharged into it from cities like Dubuque, Clinton, Davenport, Burlington, and Keokuk, that at a short distance below, the water would be apparently as pure as above them. While the same cities, on much smaller streams, would contaminate the water for a much greater distance. Of these examinations I append a few, as illustrative of the effects of dilution and oxidation. The following is taken from the *Chicago Tribune:*

EXCRETION IN THE RIVER.

"There is some discussion and inquiry as to the purity of river water from which cities are compelled to seek supplies. Nearly all cities empty their sewers, reeking with excretion, into adjoining rivers, by which it is floated through smiling valleys to other cities below. The natural view of the case would be, that it is injurious to the health of the country through which it passes, and that no city lower down the stream could use the water with safety to health. But science and observation have thrown light on this important question. To quiet some minds the following is given, from the *Boston Journal of Chemistry,* May 1:

"Ten years ago we published in the *Journal* the results of several careful analyses of the waters of Merrimac River in eastern Massachusetts. These waters were taken from the river at Haverhill, a point some eight miles below the last of the great manufacturing cities which line the banks of the river almost to its source. The cities of Lawrence with 40,000 inhabitants, Lowell with 60,000, Nashua with 15,000, Manchester with 50,000, are all upon this famous stream, and the excreta and filth of at least a half million of people, and the refuse from hundreds of immense mills, are poured into it constantly, day and night throughout the year. The waste from the mills is not only of a filthy nature, but a considerable portion consists of substances highly corrosive and poisonous; as acids, spent dyes, mineral salts, and caustic alkalies. The Pacific Mills at Lawrence are of vast extent, the largest in the world, employing about six thousand operatives, and the filth coming from this establishment would seem to be sufficient almost to poison the waters of the Atlantic Ocean. The waters examined were secured at a point, as had been stated, not more than eight miles below the outlet from these mills into the river, and at the season (July) when the stream is at a stage of water half way between

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its maximum and minimum flow. The analysis showed a high degree of purity in the water, the organic and inorganic matter falling below four grains in the imperial gallon. Results of this nature, so unexpected, created doubts as to the accuracy of the methods of analysis, but they were fully sustained by repeated testing under all the modified forms known in chemical research.

"'Standing alone, these results would serve to show the remarkable capability moving water possesses of self-purification; but the fact is strongly established by researches in England made upon the streams which are polluted by wash from the large manufacturing towns and cities. The streams in England are small, there not being one of so great a volume as the Merrimac, which we regard here as a small river. The pollution of English streams is carried to an enormous extent, the water of many, at the outfall of the sewers of large towns, being actually offensive; as it passes down the river it blackens from formation of sulphide of iron; further on the black color decreases, disappears, and the river at last exhibits no signs of odor, color, or turbidity. Again, soon after the sewage has been turned into the river the sewage fungus appears; the banks are black. A short distance further the fungus vanishes, vegetation is luxuriant, fish abound, the river clears, and no trace of black deposit can be seen. Thus the river Soar at Leicester is black with sewage. At Loughborough, thirteen miles distant, the water is perfectly clear and fish are abundant. The Irwell at Manchester is polluted with every form of filth; in nine miles the offensive character of the stream has entirely disappeared; and so in many cases.

"At no time and under no circumstances have the waters of the Merrimac became so impure, even at the point where they flow through cities, as to destroy life. Fishes in considerable numbers are found in the river at all seasons, and in the spring, shad, salmon and alewives abound.'

"Great alarm was felt in Chicago a year ago because of the bad condition of the water obtained from the lake. The enormous amount of filth carried by the river into the lake had seriously contaminated the water as far out as the crib from whence the water used by the city was obtained. Examinations of lake water at various points were made to ascertain the area of pollution. The following is the report made by the chemist of the Health Department:

"A full report of the analysis of samples of water recently taken from the lake was made by Professor Paton, the chemist of the Health

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Department on yesterday. It has been already stated in the *Times* that the professor found indications of decomposing animal matter in the water, but it was not then known from what points the several specimens were obtained. The complete report as now submitted is important as showing very satisfactorily where water may be obtained from the lake with the least liability to contamination by the city sewage.

"It shows that during the late period of high water in the river the lake was certainly contaminated at and about the crib. This contamination was greatest, at the time the samples were obtained, a quarter of a mile southwest by south of the crib; next, in the well of the crib, and the contamination seemed to grow less as the distance east or north of the crib became greater. It does not follow that the contamination was wholly from sewage—for some reason no samples seem to have been taken from the lake between the crib and the mouth of the river—but it would be difficult to convince those who drank of the water that it came from any other source. Samples were taken at varying distances from the shore as far north as Highland Park, twenty-two miles from the city. In these only small traces of free ammonia and little albuminoid ammonia were found. The water seemed to grow purer the further north the samples were taken, after passing the outlet of the Fullerton Avenue conduit.

"The following table gives some of the results. Samples were taken both from the surface and at or near the bottom of the lake at the point indicated. The figures relate to the samples taken from the bottom. The analysis of the surface water varied slightly. The impurity of the water is indicated by the amount of ammonia it contains:

WHERE TAKEN.	PARTS PER MILLION.	
	Free ammonia.	Albuminoid ammonia.
One-fourth mile southeast of crib	.36	.42
Well of crib	.32	.22
One-fourth mile east of crib	.16	.10
One mile east of crib	.10	.03
Two miles east of crib	.06	.07
One-half mile east of conduit	.07	.18
Two miles off Evanston Pier	Trace.	.08
Two miles off Grosse Point	.06	.11
One mile off Highland Park	.02	.11
Two miles off Highland Park	Trace.	.06

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I also quote from the reports and papers of the American Public Health Association to show the effects of dilution and oxidation in the purification of even greatly polluted water:

THE SPONTANEOUS PURIFICATION OF RIVER WATER.

While the animal matters which find their way into wells from cess-pools and privies are capable of producing the fatal results to which I have called your attention, it is now well settled that such matters are speedily oxidized, and destroyed, and thus rendered harmless, when they flow into running streams, by the oxygen held in solution in the water. Dr. Alfred Taylor stated before the Parliamentary Commission that "organic matter in water is only offensive while in process of decay; when this operation is completed it ceases to be offensive.

Sewage which would poison an ordinary well becomes harmless in the running stream, and while the well is always open to suspicion, the river, though it drain populous districts, will, nevertheless, supply wholesome water. Having recently had occasion to study this question in connection with the project for supplying the city of Albany from the Hudson River, I have collected some facts and opinions which I will present to you as embodying the views of the most recent.

Dr. Frankland, in an article for the *Quarterly Journal of Science*, says:

The population in the basin of the Thames, above where water is taken, is 1,000,000, the drainage of some 600,000 of whom is poured into the river; the sewage is so thoroughly oxidized that no trace of it can be detected in an unoxidized state. The average flow of the river at the point where the companies take their supply is 800,000,000 gallons daily. The sewage contained would be $\frac{2250}{1000000}$.

The Royal Commission reports as follows:

But though for these reasons we believe that the organic contamination of the Thames is much less than is commonly imagined, still it would be sufficient to do great mischief were it not for a most beneficial provision of nature for effecting spontaneously the purification of the streams. Some of the noxious matter is removed by fish and other animal life, and a further quantity is absorbed by the growth of aquatic vegetation; but, in addition to these obstructions, important changes are effected by chemical action. The organic compounds, dissolved in water, appear to be of very unstable constitution and to be very easily decomposed, the great agent in this decomposition being oxygen, and the process being considerably hastened by the motion of the water. Now, as such waters always contain much air dissolved in them, the decomposing agent is ready at hand to exert its influence the moment the matter is received into the water; in addition to which the motion causes a further action by the exposure to the atmosphere, and when (as in the Thames) the water falls frequently over weirs, passes through locks, etc., causing further agitation and aereation, the process must go on more speedily, and more effectually. The effect of the action of oxygen on these organic matters, when complete, is to break them up, to destroy all their peculiar organic constitution, and to rearrange their elements into permanent inorganic forms, innocuous, and free from any deleterious quality. This purifying process is not a mere theoretical speculation. We have abundant practical evidence of its real action in the Thames and other rivers.

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The following is the testimony of Sir Benjamin Brodie, Professor of Chemistry in the University of Oxford:

Oxidation is constantly going on in the soil and in the river; and, therefore, there must be some point at which the perfect destruction or oxidation of its animal matter must take place. What I think is much more important still, is another point; namely, the great dilution of the material; and I should rely upon the dilution quite as much, and more, than upon the destruction of the injurious matter. Supposing the sewerage of a large town, as Oxford, pouring into the river, there are numerous feeders and tributary streams to the river, which effectively dilute the sewerage. The sewerage is gradually getting less and less, and, therefore, its noxious character diminishes and ultimately disappears.

Testimony of Dr. Parkes, Professor of Military Hygiene of the Army Military School at Netley:

Q. Have you observed, in a case where sewerage has been discharged into a river, that after running three or four miles the effect of the sewerage has been destroyed?

A. Yes, we have; that in the case of the Southampton water supply. Some sewerage passes into the Itchen River, but it is quite destroyed by the time the water is distributed in Southampton; at least there is no detectable quantity.

Q. What is the distance?

A. The distance is six or eight miles. I could not undertake to state the distance in which water would purify itself in that way, but there is no doubt that it does purify itself, although in what distance, or in what time, or under what precise circumstances, I could not say.

Testimony of Mr. Leach, Engineer to the Thames Conservancy Board:

Q. How soon, in your observation, is the effect of sewerage destroyed by its flow and admixture with the water?

A. At Windsor, it is discharged into a most unfavorable point in the river, where there is little or no stream at ordinary times. The matter which is passed out of the drain, floats about in the river there to a very great and very disgusting extent. Two miles, or even a mile below, I could find no traces whatever of the sewerage.

Testimony of Mr. Hawksley, Vice-President of the Institute of Civil Engineers:

Q. You remember, do you not, the original condition of the river at Leicester, after receiving all the sewerage of the town into it?

A. Yes, perfectly well; at Leicester the water was as black as this ink. I do not mean to say that it was absolutely so thick, but looking at it in a mass, it was as black as ink; nothing would live in it, and the smell was abominable; but by the time it got to Loughborough, twelve miles below, it was entirely restored to its pristine condition; you could stand on the bridge, there, and see the fish swimming

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among the beautiful reedy and other plants growing in the water, just as in the purest streams; you could see every pebble at the bottom; that is an instance of the effect of oxidation.

Testimony of Dr. Letheby, Medical Officer of Health in the Corporation of London:

Q. Taking the case of the cholera disease, and the discharges from the human body being mixed up with the sewerage, do you consider that any germs of that disease would be carried down in water?

A. At the present moment, we do not know what the germs of disease are; if the germs of the disease be decomposing matter, then I do not think that they exist in the water; but if the germs of the disease be living matter, then it is possible that they may exist in the water; but as nobody, as far as I am informed, can tell us what the germs of cholera are, it would be premature for me, or anybody, to theorize as to the probability, or the possibility of their existing in the water.

FILTRATION OF RIVER WATER.

The waters of Western rivers contain after heavy rains so much earthy and vegetable matter in suspension, that they are unfit for domestic use unless filtered. Different methods are in use to accomplish this purpose. The method practiced by the water company at Des Moines is, to sink iron cylinders, open at the bottom, in the channel of the river, and into the sand and gravel ten feet or more, the water being filtered by passing up into the cylinder through the stratum of sand and gravel at the bottom of the river. This method proved successful while the demand for water was limited, but at present fails to furnish clear water to the city, by reason of the want of capacity of the filtering chambers. Immediate steps will be taken to sink additional cylinders, when it is believed that a sufficient supply of clear water will be furnished to meet all demands.

Another method is, by passing the water over filtering chambers, the chambers being constructed of stone laid in cement, ten feet in depth, of length and breadth to furnish an ample supply of water. On these chambers is constructed the filtering bed.

In building this up, provision is first made for the ready collection of the water, by constructing upon the floor of the basin from which the water is to be filtered, into the chambers below, channel ways of stone or brick, laid dry; then follows a layer of broken stone, of three or four inches in diameter. This is succeeded by gravel, screened so as to be of uniform size (a layer of coarse being followed by one or more of smaller size); upon the gravel are placed layers of sand of different degrees of fineness. The filtering bed at Poughkeepsie, New York, has

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a total thickness of six feet. The water flows over this bed to the depth of three or four feet.

The objection to this method is the necessity of frequent cleansing of the filter-beds. The more turbid the river the oftener must this be done. In the worst stages of some rivers, this has to be done as often as once a week. Another objection is the liability of the water in the basin to freeze to a great depth in severe winters.

Still another method of purifying water is storing it in large reservoirs, when the stream is clear, and drawing from this supply when the river is turbid.

LEAD POISONING.

Another and dangerous source of contamination of water, and especially of river water, arises from the use of lead pipe to conduct the water from the street mains to yards and houses. The oxygen in the water acts upon the lead, forming compounds which are injurious to health when taken into the system. Soft water is contaminated much more rapidly than hard, for the reason that the mineral constituents of the hard water soon form an impervious coating on the inner surface of the pipe. The water of Iowa rivers holds in solution considerable quantities of mineral matter, and lead pipes become speedily encrusted with them, especially with the sulphate of lime. Care, however, should be taken to allow the water to run long enough to discharge the water standing in the service pipe, before drawing for domestic use.

PURIFICATION OF WELL WATER.

When the water of wells is once polluted by the contents of cess-pools, or privies, it is difficult, or, I may say, impossible to purify it. Oxidation can do but little on account of the small amount of air held in suspension, and the limited exposure to the external atmosphere. Purification by dilution is evidently impossible. The only methods of purification are, by boiling, or filtering through animal charcoal, and it is doubtful if the latter mode is perfectly safe.

When a well is found to be polluted except from surface drainage, it should be filled up and a new one dug sufficiently distant from sources of contamination to insure pure water.

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TESTS OF THE QUALITY OF SOIL WATER.

The Secretary of the State Board of Health of Michigan reports the following:

The question of the fitness or unfitness of soil water for domestic use can be absolutely determined only by a careful chemical analysis. But many persons who would not wish to incur the trouble and expense of a chemical analysis will yet desire some popular means of testing the water they use. The following methods of testing such water are presented, not as the most complete possible, but such as anyone can supply without the skill and appliances of the practical chemist. If such tests cast suspicion upon the quality of the water, and especially the water appears to cause sickness in any one using it, the water should be changed, or else a careful analysis should be made by some competent chemist.

Color—Fill a bottle made of colorless glass with the water; look through the water at some black object; the water should appear perfectly colorless and free from suspended matter. A muddy or turbid appearance indicates the presence of soluble, organic matter, or of solid matter in suspension. It should be "clear as crystal."

Odor—Empty out some of the water, leaving the bottle half full; cork up the bottle and place it for a few hours in a warm place; shake up the water, remove the cork and critically smell the air contained in the bottle. If it has any smell, and especially if the odor is in the least repulsive, the water should be rejected for domestic use. By heating the water to boiling an odor is evolved sometimes that otherwise does not appear.

Taste—Water fresh from the well is usually tasteless, even though it may contain a large amount of putrescible organic matter. Water for domestic use should be perfectly tasteless and remain so, even after it has been warmed, since warming often develops a taste in water which is tasteless when cold. If the water, at any time, has a repulsive or even disagreeable taste it should be rejected.

Heisch's test for sewage contamination.—The delicacy of the sense of smell and of taste vary greatly in different individuals; one person may fail to detect the foul contamination of a given water, which would be very evident to a person of a finer organization. But if the cause of a bad smell, or taste, exists in the water, the injurious effects on health will remain the same whether recognized or not. Moreover, some waters of very dangerous quality will fail to give any indication by smell or taste. For these reasons I attach especial importance to Heisch's test for sewage contamination or the presence of putrescible organic matter. The test is so simple that anyone can use it. Fill a clean pint bottle three-fourths full of the water to be tested, and dissolve in the water half a teaspoonful of the purest sugar —loaf or granulated sugar will answer—cork the bottle and place it in a warm place for two days. If in twenty-four to forty-eight hours the water becomes cloudy or muddy it is unfit for domestic use. If it remains perfectly clear it is probably safe to use.

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OUTBREAKS OF ZYMOTIC DISEASES CAUSED BY USE OF POLLUTED WATER.

From the reports of the Massachusetts Board of Health of 1871 and 1876:

A somewhat extensive though mild epidemic of intestinal and gastric disease occurring in a hotel at Rye Beach, New Hampshire, was traced to the use of impure ice. The ice was taken from a pond in which was found a mass of decomposing material composed of marsh mud and sawdust. The water near this emitted an intolerable effluvium when stirred, and analysis showed a dangerous quantity of organic matter. On ceasing to use the ice the epidemic disappeared.

In December, 1865, typhoid fever appeared in Pittsfield, in a family of about forty persons, a boarding school for boys. The head of the school, and four boys, died. Eight or ten other cases recovered. The surrounding community was healthy. In this family, the water used was from a well under the wash-room. The drain from the wash-room was obstructed, and the foul water found its way under the floor, and into the shallow well. The well was closed, the family supplied with water from another source, and the fever subsided.

In illustration of the effects of drinking water made foul by decomposing organic matter, the following instructive facts are related by our correspondent at Sutton:

A large house in this village is supplied with water from a well in the front yard, three rods from the house. Connected with the house is a barn, without cellar, some three rods from the well. In December, 1868, a trench, three or four feet deep, was dug from the well to a point near the middle of the barn, where a pump was set, and a pipe connecting it with the well was laid in the trench; after which the earth, which was in large, frozen chunks, was filled back into the trench. In the house was kept a boarding-school for boys, of whom there were ten or twelve. Three little girls were also there, aged twelve, eight, and three years, belonging to the family of the owner of the house; there were, therefore, fourteen or fifteen children who drank from the well. The oldest boy was seventeen or eighteen years old, while the others were of ages from ten to thirteen. Everything went well until after the thaws in February and March, 1869, when the water had a decided taste and smell of stable-manure. March 26th one of the boys, thirteen years old, was seized with typhoid fever; another, twelve years old, on the 31st of March; another, eleven years old, April 2d; another, ten years old, April 4th, and another, twelve years old, April 9th. April 20th, one of the little girls, eight years old, was seized. Each of these six children (all of whom finally recovered) drank water with their meals, from the well in the yard. Some of the older boys drank coffee in the morning, and tea at night. The manner in which these children were attacked, and the fact that this house had been free from typhoid fever for many years, and the water heretofore known to be very pure and wholesome, leads me to the conclusion that the use of the water thus impregnated was the cause of the disease occuring where, and just at the time it did. My theory is, that while the ground, manure, etc., were frozen, the water was all right; but when it thawed, and the previously frozen filth leached through the soft and loose earth along the track of the pipe into the well, the effect of the poison was felt most perceptibly by those

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who used the polluted water most freely, while those who used it less freely escaped entirely.

Our correspondent from Worcester says:

When I first came to Worcester there was a row of privies in Maple Street which drained into the wells near by, and typhoid fever raged until the use of the water was discontinued.

POLLUTION OF WATER FROM GRAVEYARDS.

Statements taken from the report of the Secretary of Michigan State Board of Health:—

Unfortunately, we need not go to France to learn what is the influence of graveyard water on the public health. In February, 1875, I received a letter from Dr. Chapman, of Grand Rapids, calling my attention to the serious sickness which had prevailed in families living on a certain alley in that city. From this letter I gather the following facts: There is a graveyard in Grand Rapids called the Fulton Street Cemetery. The soil in this cemetery to the depth of ten to fifteen feet is gravelly and sandy, and beneath this porous soil is a tenacious clay which dips to the east, toward the alley, on which are ten houses. The people living in these houses derive their water from wells, which penetrate two or three feet into this clay. In seven of these ten houses, severe sickness of a typhoid or typho-malarial type prevailed, the sickness lasting from fifteen to thirty-five days. In the family which has lived the longest on the alley, of six persons, five had the fever, three of them in a very severe form. Some of the wells were not more than twenty feet from graves. The impervious clay here served as a water-shed to convey the filtration of the graves directly into the wells, and these poor people were drinking a *cold infusion of death!*

ANALYSIS OF IOWA WATER.

I sent circulars some months since to superintendents of water-works in the State containing the following list of questions. Nearly all replied:

DES MOINES, June 10, 1880.

DEAR SIR—The State Board of Health desire information regarding the water supply of cities in this State. Will you answer the following interrogatories relative to your city?

1. What is the source of water supply?
2. Is the water filtered before entering pipes?
3. Are there any sources of contamination above the main pipes, as sewage, drainage from woolen-mills, slaughter-houses, etc.? If so, of what nature?
4. Has any analysis of the water been made? If so, give it.

Any other statements regarding your water supply, its purity, etc., will be thankfully received.

Very respectfully,

W. H. DICKINSON.

Committee on Water Supply.

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I also requested the health officers of cities which have water-works to send samples of river and well water to Professor Pope, of the State Agricultural College, for analysis, together with such facts relating to possible or probable contamination of the water as he could obtain, such as characters of soil, depth of well, location of cess-pools, privy vaults, etc., and pollution of rivers from excrementitious and other matter, character of bed, banks, etc.

The results of the analyses and the statements of health officers and superintendents of water-works, are herewith submitted:

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ANALYSES OF IOWA WATER.*

RIVER WATER.

LOCALITIES.	Free ammonia.	Albuminoid ammonia.	Chlorine.	Suspended matter.	Solid residue on evaporation.	Loss on ignition.	Total inorganic, or mineral matter.	Hardness in gr's per U. S. gal. of 58.328 gr's.
1. Mississippi, Burl'n..	0.00080	0.01800	0.1691	8.9241	21.5396	2.4381	19.1015	6.22
2. Mississippi, M'c'tine	0.00230	0.01280	0.1166	0.8457	8.2825	2.5081	5.7744	5.81
3. Mississippi, Dav'p't.	0.00510	0.01760	0.0786	1.7731	13.7070	1.8314	11.8756	7.47
4. Mississippi, Clinton.	0.00155	0.02331	0.2740	6.4160	15.6780	2.5420	13.1350	5.81
5. Iowa, Marshalltown	0.00130	0.00990	0.0729	2.6830	16.9151	1.9831	14.9320	11.62
6. Iowa, Anamosa....	0.00340	0.01100	0.1048	.....	.....	.....	.....	5.39
7. Cedar, Cedar Rapids	0.00000	0.01200	0.0991	3.6863	14.1153	1.9014	12.2139	9.13
8. D. Moines, Ott'mwa	0.00230	0.02330	0.1604	22.2462	33.9468	3.7329	30.2139	4.56
9. Raccoon, Des Moines	0.00150	0.00750	0.1137	0.2041	9.1574	0.6766	8.4808	8.30
10. Missouri, C Bluffs..	No	report	rece'ed					

SHALLOW WELL WATER.

All wells not sunk below rock formation, or impermeable bed of clay, are deemed shallow wells.

11. Marshalltown.....	.....	.....	15.0743	.....	60.9527	.....	52.2320	43.98
12. Anamosa (E. Booth)	.....	.....	3.8903	.....	32.3137	.....	25.6643	21.58
13. Anamosa.....	.....	.....	1.2043	.....	15.6319	.....	12.1613	8.30
14. Ced. Rapids (2d w'd)	.....	.....	5.0220	.....	55.2366	.....	49.3454	20.41
15. Ced. Rapids (1st w'd)	.....	.....	9.4374	.....	65.8523	.....	56.0533	31.85
16. Ottumwa.....	.....	.....	4.0946	.....	34.2385	.....	30.0389	17.01
17. Clinton.....	0.01920	0.04720	1.0980	.....	32.8960	.....	26.9470	26.56
18. Burlington.....	.....	.....	5.1037	.....	50.4537	.....	43.7450	46.89
19. Des Moines.....	0.00120	0.00260	3 5405	.....	49.6711	.....	43.8393	39.84
20. Des Moines.....	0.00310	0.00870	4.4486	.....	75.9663	.....	69.9003	58.10
21. Davenport.....	0.00150	0.00730	2.8880	.....	43.8393	.....	40.9229	26.56
22. Muscatine.....	.....	.....	10.1009	.....	54.0700	.....	46.4874	40.18

DEEP WELL WATER.

23. Dubuque.....	.....	.....	0.1883	.....	13.0071	0.8171	12.1900	17.01
24. Dubuque.....	.....	.....	0 2182	.....	14.8386	1.0149	13.8938	19.09
25. Dubuque.....	.....	0.00170	0.2041	.....	14.4886	0.9448	13.5438	19.09
26. Dubuque.....	.....	.....	8.9970	.....	41.2378	.....	32.8036	34.03
27. Des Moines.....	0.00230	0.00230	1.9239	.....	48.6398	.....	43.0927	39.84
28. Des Moines.....	0.00690	0.00350	4.8062	.....	42.4794	.....	37.6798	31.54

ICE WATER.

29. Mississippi River...	0.01550	0.01130	trace	.....	1.3765	0.9449	0.4316	0.
30. Des Moines River..	0.01240	0.00310	trace	.....	0.6998	0.2333	0.4666	0.
31. Des Moines River..	0.01390	0 00190	trace	.....	0.7582	0.2916	0.4666	0.

*Analyses made by Prof. T. E. Pope, of Iowa State Agricultural College. The results are expressed in grains per U. S. gallon of 58.328 grains.

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WHERE SAMPLES WERE COLLECTED.

RIVER WATER.

WATER-WORKS, BURLINGTON.

1. Source of supply, Mississippi River; distributed by Holly system; water filtered before entering the pipes; no source of contamination above main supply. Sample collected June 24.

WATER-WORKS, MUSCATINE.

2. Distance from source to point where sample was collected 1,100 feet. Two streams, having several slaughter-houses on their banks, enter the river above the water-works conduit pipes; also several sewers. An iron conduit pipe projects 700 feet into the river, fourteen feet below low water mark, through which the water is pumped into the reservoir which supplies the street mains. Sample collected June 24.

WATER-WORKS, DAVENPORT.

3. Sample collected August 13, from hydrant supplied by water-works. The water is taken from Rock Island Rapids, about one-half mile above the termination, where the current is very strong, by means of conduit, which runs some distance out into the river. No filtration.

WATER-WORKS, CLINTON.

4. Sample taken from hydrant at Lee's drug store, corner Fifth Avenue and Second Street, September 6, 1881. Water is pumped from Mississippi River. The conduit extends far into deep, quick current, and before reaching the pumps passes through two feet of sand and gravel. No contamination above the works except ordinary surface drainage. The city sewers are all below the pumping works.

WATER-WORKS, MARSHALLTOWN.

5. Supplied from Iowa River; water pumped into reservoir, which supplies street mains. Sample collected from hydrant, June 18. Water is filtered. No sewerage or other animal polluting matter known to gain access to the river above the water-works conduit pipe.

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WATER-WORKS, ANAMOSA.

6. Water pumped into reservoir. Sample taken from hydrant June 22.

WATER-WORKS, CEDAR RAPIDS.

7. Water pumped into street mains direct through conduit pipes which enter the river above the city. Water not affected by anything except ordinary surface drainage. Street mains also supplied in part from a well. When water is drawn from the well, it is filtered. Samples taken from a hydrant, July 6, but whether it is from the river or well is not reported. The analysis indicates it is from the river.

WATER-WORKS, OTTUMWA.

8. Water is pumped into a reservoir, which supplies the street mains. Samples taken from hydrant on Main Street June 29. Several packing and slaughter-houses, from which the offal enters the river, about a half a mile above the pumping works.

WATER-WORKS, DES MOINES.

9. Supply taken from a filtering tank fourteen feet below the bed of Raccoon River, and pumped directly into the street mains by the Holly system. Sample taken from hydrants one-half mile from the river July 16. No contamination of water above the source of supply by sewage, manufactures or slaughter-houses.

10. No report.

SHALLOW WELL WATER.

11. Well fourteen feet deep; soil, loam; subsoil clay, yellow, friable, and porous; water-bearing strata is gravel and sand. Sample taken June 24.

12. E. Booth's. Depth, thirty-five feet; walled with stone.

13. J. C. Deitz. Same as No. 12.

14. Located in the Second Ward. Depth, sixteen feet; diameter three and one-half feet; cribbed with pine lumber, and walled with stone inside of cribbing, black loam six feet; yellow sand eight feet; coarse gravel and sand water-bearing strata two feet; several privy vaults eight feet deep, fifty to sixty feet distant; water raised with an iron pump. Sample collected July 6.

15. Located in First Ward, half mile distant from foregoing No. 14, and 400 feet from the river; livery stable directly in the rear;

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nearest privy fifty to sixty feet. Soil and depth the same as No. 14, except the loam which is only a few inches in depth; more water drawn than from any well in the city. Samples collected July 6.

16. Depth twenty-five feet; water raised with a bucket; location on fourth street from the river, at the foot of the bluff; soil drift; no contamination by sewerage, drainage, or surface water. This well is one of the oldest in the city, and a fair sample of the natural water of the city.

17. Clinton. Sample taken from school-house well between Sixth and Seventh Avenue, Fourth Street, September 6, 1881.

18. No description received.

19. Driven well on bottom-land, corner of West Sixth and Market streets. Soil, drift, depth twenty-two feet; an old cellar filled with rubbish twenty feet distant; privy without vault, fifteen feet distant; back of residence fifteen feet distant, where all slops from kitchen are thrown. Sample secured July 19.

20. Location corner of East Third and Elm streets; two blocks from the Des Moines river; open; drift soil; depth of well twenty feet; depth of water five feet; several back doors of residences six and nine feet distant, where kitchen slops are thrown; two privies without vaults forty and fifty feet distant. Sample collected July 19 by lowering glass bottle to the bottom of the well.

21. Open; depth of well twenty feet; diameter four feet; soil, black loam, yellow and black clay and gravel, the latter being on a level with the river bed. The water in this well rises and falls with the river; privies fifteen and twenty-five feet distant. Sample collected August 13.

22. Depth of well twenty-five feet; diameter four feet; distance from drains and cess-pools, sixty feet; soil, clay; subsoil, sand; water-bearing strata, sand and gravel. Sample collected June 24.

DEEP WELL WATER.

ARTESIAN.

23. Depth, 1,600 feet; diameter, six inches; water rises to within thirty feet of the surface. Sample collected July 7.

WATER-WORKS AT DUBUQUE.

24. The supply comes from a tunnel or adit about one mile in length, penetrating the bluffs and running a due west course, varying in depth from the surface from one hundred to two hundred feet, and

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sixty to eighty feet below the mineral bearing strata. Much of the distance is through solid rock, with frequent openings and fissures, through which the water is constantly forcing its way and the supply increasing. The tunnel is located about two and a half miles out of the city. A large reservoir about four hundred feet below the mouth of the tunnel, of the most substantial character, fully enclosed with heavy walls, shutting out all surface water, gives a storage capacity of about three million gallons, including the tunnel. The connection is made from a twelve-inch water main leading from the mouth of the tunnel to the city, running parallel with the reservoir and entering at the bottom, thus giving it the effect of a boiling spring. Sample collected July 7, from the tunnel or level.

25. Sample taken from a hydrant July 7, two miles distant from the reservoir.

26. Depth, thirty-five feet, of which six feet are limestone and slate formation.

27. Location, 838 West Fifth Street (F. Geneser); open, tight curb, roofed; brick wall; depth of well, forty-five feet; depth of water, twenty-one feet; soil, alluvial, one and one-half feet; yellow joint clay, twenty-one feet; gravel, one and one-half feet; blue and yellow clay, fifteen feet; sandstone, two and one-half feet; yellow clay, three and one-half feet; street, one hundred feet east, four feet above the mouth of the well; stable and three privy vaults, sixty, forty and thirty feet distant westward; privy vaults, ten feet deep, and bricked loose without drains; descent from the well to privy vaults and stable three to five feet; no slops thrown on the lot. Sample collected July 19, by lowering a bottle to the bottom of the well.

28. Location on Center Street between Fourth and Fifth; open; depth, thirty-five feet; depth of water, ten feet; soil, joint clay; no surface drainage can get entrance; privy vaults, twenty, forty-five, fifty and sixty feet distant. Water raised by wooden bucket. Sample collected July 19, by lowering a glass bottle to the bottom of the well.

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ICE WATER.

AT DAVENPORT.

29. From ice taken at Davenport near the river channel in the lower part of the city, and below the city sewers.

AT DES MOINES.

30. From ice taken July 19, from a delivery wagon of Des Moines Ice Company (Grefe); melted by sun heat in a clean, new, earthen jar, and transferred to glass bottle. The ice was taken from Des Moines River above the dam.

31. From ice taken from the delivery wagon of Capital City Ice Company, at Des Moines the same date, and prepared in the same manner as No. 30. The ice was taken from Des Moines River below the dam.

REMARKS.

For the information of the general public, it may be said in explanation of the foregoing table, that the presence of albuminoid ammonia and chlorine in drinking water is regarded with suspicion. Albuminoid ammonia comes from pollution by sewage or excrementitious and vegetable matter. Chlorine is a constituent of common salt, hence, at a distance from sea-water, its presence in drinking water indicates contamination by drainage from privies and stables or urninary sources. According to Frankland, the celebrated English chemist, water containing .55 parts, or grains, or less of chlorine per United States gallon of 58.328 grains, may be regarded as pure and healthful, while water containing 2.7 parts, or grains, or over, should be rejected for drinking purposes.

While this may be true as a general rule, it will not apply strictly to Iowa, where the earth is rich in chlorides and sodium, so that a sample of water entirely free from possible contamination by surface drainage may contain chlorine, and yet not be objectionable for drinking purposes. So, also, as to albuminoid ammonia. What would apply to rivers would not apply to deep and shallow wells. Some rivers are entirely unpolluted by sewerage or manufacturing establishments. It is well known that peat abounds extensively in Iowa. Rivers receiving the drainage therefrom would show the presence of albuminoid ammonia in their water, yet it would not be objectionable for drinking purposes. It is very important, in making an analysis

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of water, to know the geology and topography of the district supplying the water. In this the collectors of samples sent for analysis have been unfortunately neglectful in obeying instructions given.

The suitability of potable or drinking water for use must be decided chiefly from the proportion of organic matter or elements it contains. In deep well or spring waters, however, little importance is attached to this, for the reason that in such waters the organic elements may be derived from vegetable and not animal sources. Water from deep wells and springs usually shows the smallest amount of organic matter, the thick strata through which the water has passed having destroyed by oxidation most of the organic matter.

Upland surface waters in uncultivated districts are least liable to contamination from animal excreta, the organic matter contained in them being almost entirely vegetable, and usually peat.

Shallow well water is always largely dependent on the surroundings of the well. Such wells are, with few exceptions, polluted by animal matter. The water-bearing strata may be powerful enough to destroy and oxidize much of the polluting matter, but when overtasked, the purification is slight, and the water necessarily becomes, and often is, as unfit for use as that from a common sewer. Of the shallow wells shown in the above, No. 13 comes nearest the standard of purity. All others are objectionable in chlorine, especially Nos. 11, 15, and 22.

Of the different varieties of waters, the best for dietetic purposes are spring and deep well waters. Sample No. 26 would appear to be an exception. Although classed in the deep wells, the analysis indicates an extensive pollution by excrementitious matter, probably through fissures in the limestone rock.

Dr. Charles Smart, in his report to the Medical Director of the United States army, May, 1876, on spring, well and river waters, of the Department of the Platte, says the water examined at eighteen military posts contained free ammonia 0 to .98 parts per 1,000,000; albuminoid ammonia .10 to .98 parts per million. Lodge Pole Creek, of albuminoid ammonia, .19; Black's Fork, of albuminoid ammonia, .20; Douglas's Brook, of albuminoid ammonia, .28. Snow just fallen at Fort Bridger yielded .30 parts per United States gallon of water, had .50 parts per million of albuminoid ammonia, equal to .029 grains or parts per United States gallon of 58.328 grains. The albuminoid and free ammonia in the water of these far western streams, whose sources are clefted rocks, comes from dead vegetable matter along their banks, yet these streams are deemed to be the purest water

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known. English authorities would condemn them as dangerous. Dr. Smart concludes that where the free and albuminoid ammonia is of vegetable origin, as in most of western waters, .30 parts per million, or .029 grains per United States gallon is allowable.

The inference to be drawn from the investigation of Dr. Smart is, that no definite standard can be made by which to fix potable water for dietetic use, so as to say that a water may contain so much, if it contains more it is bad; for where a certain amount of the same substance in one case indicates a fearful contamination, in another it would be harmless, or indicate only the normal constituents of the water. As has been stated, the geology and topographical surroundings in each case must be considered in deciding the suitability of any water. As a general rule it may be said river waters are the most objectionable from their liability to pollution by the refuse sewerage of towns. They are the natural carrier of all waste matter which in solution can be carried along by the current. No river water should be used for dietetic purposes without thorough and complete filtration.

ICE WATER.

POPULAR IDEAS.

Water from ice is generally considered pure and healthful. The notion that ice purifies itself by freezing is fallacious, and cannot be supported by scientific observation. Organic matter suspended in water would certainly be drunk by any person using the ice in the ordinary method. Ice should never be taken from water which is unfit for drinking purposes. Of the samples given in the foregoing table, No. 29 is objectionable. The other two are remarkably pure. The difference in favor of No. 31, may be accounted for by the fact that the water above the dam is still, having very little current, and therefore holds in suspension more organic matter than the water below the dam, where is a strong current, which together with the rapid plunging of the water over the dam would tend to oxidize or remove the impurities of organic matter in the water.

It should be borne in mind that all the foregoing samples of river water were collected when streams were swollen by floods and the waters turbid.

Des Moines, Iowa, *November 5, 1881.*

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SLAUGHTER-HOUSES.

REPORT OF

P. W. LEWELLEN, M. D.,

CHAIRMAN OF THE

COMMITTEE ON SLAUGHTER-HOUSES,

OF THE

STATE BOARD OF HEALTH.

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SLAUGHTER-HOUSES.

MR. PRESIDENT—In attempting to make a report on this subject, I have to regret at the outset the lack of material that I have been able to collect upon which to base a report.

Soon after my appointment to report on this subject, the following circular of inquiry was sent out addressed to the health officer of every local board in the State, relative to the existing condition and apparent effect of slaughter-houses in their respective towns and cities :

Form 6B.]

CIRCULAR OF INQUIRY CONCERNING SLAUGHTER-HOUSES, ETC.

To the Health Officer of .....

Will you please send as soon as possible, in the enclosed directed and stamped envelope, answers to the following questions :

1. Please state the name of your city.
2. How many inhabitants in you city?
3. How many butchers or meat-market men are there?
4. How many places for slaughtering animals?
5. How many animals are annually slaughtered, specifying the number of
   a. Beeves—
   b. Sheep—
   c. Calves—
   d. Hogs—
   e. Other animals—
6. How many butchers do their slaughtering in one place?
7. How are the slaughter-houses situated in reference to the city limits?
8. How are they situated in reference to thickly-settled portions of the city?
9. Are any of the slaughter-houses now offensive to people living near them, or passing them?
10. Have any cases of sickness occurred fairly attributable to such causes? If so, state full particulars.
11. How are the slaughter-houses floored?
12. How are the blood, offal and bones disposed of?
13. What is the drainage of the slaughter-houses?
14. Does the drainage from any of them go into a sewer?
15. How are they supplied with water?
16. What are the opinions of the men engaged in the slaughtering business as to the comparative economy and convenience of private separate slaughter-houses, and *one* place in which all slaughtering should be done?

FAT-RENDERING AND BONE-BOILING.

17. How many fat-rendering and bone-boiling establishments are there in your city?
18. Are any of them as now carried on offensive to the people?
19. Do they cause sickness?

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20. Have any complaints been made in your city as to unwholesome meats being offered for sale?

21. Are the meats now sold in your city properly inspected before being offered for sale?

22. With respect to fat-rendering, bone-boiling, etc., what are the opinions of the men engaged in the business as to the economy and convenience of private separate places, compared with one place in which to do all such work?

A prompt reply is respectfully solicited by

P. W. LEWELLEN,
Member of State Board of Health.

Clarinda, May 20, 1880.

But few of these were carefully and reliably answered, the delay and incompleteness of the reports being most probably due to the fact that the Board was new and its requirements and advantages not well understood or appreciated, even by many physicians.

The circulars were, in very many instances, not answered by a health officer, but the blanks were filled by the city recorder or township clerk and returned; others were answered by a health officer, but evidently from the reports of others, and without any examination on their part at all; one being about as unreliable as the other, and containing but few facts which can be utilized in a report of this kind.

Considering these difficulties under which I have labored, you will readily understand that my report must of necessity be very meager and incomplete.

I now think it would have been better to have delayed sending circulars to the local boards of health until they had more time to organize, and had learned more of the practical workings of the law, and the ends which it sought to accomplish. When this is properly understood I think there will be more sympathy with it, and all will be willing to aid us in securing data, and otherwise assist in enforcing its injunctions.

The importance of the methods employed by butchers in selecting animals, killing, and preparing meat for market is, I am convinced, not fully appreciated by the consumers of meats.

About the only facts of importance which I have been able to gather from the reports mentioned, are relative to the construction of slaughter-houses and the disposition of the offal, and it is apparent that there is urgent need of reform in regard to both.

Generally, slaughter-houses are built of the roughest material and in the cheapest manner possible, floored generally with plank, most frequently with pine, the floor nearly always being raised from one to two feet from the ground, and with no provision for carrying away the blood, which is allowed to flow over and through the floor, which

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soon becomes saturated as well as the ground beneath, this being left in part to decompose, as no amount of washing will suffice to remove it all after once being allowed to saturate the floor and its surroundings. In addition to this, hogs are kept in adjacent lots, to which the offal is thrown, which, being only partially consumed, the residue is left to decompose in the sun. I should have added in this connection that the water used in dressing animals for market is from wells surrounded by all these contaminating influences and must necessarily be impure.

This a correct description of most, or nearly all, the slaughter-houses within the State limits, so far as my information extends, and when we consider this condition of things existing all through the hot summer months, where from five to a dozen or more beeves are slaughtered per week, beside other animals, it would be hard to imagine that the atmosphere surrounding those places could be other than *rank* and *offensive* to the last degree.

We cannot expect our meats to come to us perfectly clean, pure and wholesome when prepared in such filthy places as these. Its being frequently left to cool in this putrid atmosphere is sufficient of itself to taint and poison it, thus rendering it unfit for human consumption.

In this connection I would call attention to the following communication:

MIDDLETOWN, IOWA, August 10, 1881.

Secretary State Board of Health:

DEAR SIR—The consumption of meat is becoming so great in this country, particularly fresh beef, that I think it very important the matter should be looked after, especially in times when beef-cattle are scarce, that not so many diseased animals are slain.

When we remember that a great many people eat their beef almost, if not entirely, raw, it becomes more important that it should be strictly free from disease.

To demonstrate what I mean I will give a few instances which happened here recently:

Our little town has two meat-markets. One of the slaughter-houses in town and near to my place; the other but a little way off. Hence, I have a good chance to find out what kind of animals are used for beef.

In the spring I saw a butcher from Burlington drive an animal into the shop near me. The next day he came with a wagon and took it away. This was such a surprise to me that I inquired concerning the animal and found that it had some spinal disease. The owner had tried for some time to fit it for beef, and finally

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succeeded in getting it passable. In driving it to Burlington it gave out when they got here, so they drove it into the slaughter-house and "knocked it in the head to save it."

A few days ago I saw a fresh milch cow go to the shop. Cows being worth more than beeves, I thought I would inquire a little about her. I found she was a good cow, but she took fits, so the owner thought he would sell her.

I have seen several go in that I thought were consumptive. Have seen calves thrown out that were almost matured.

Now, my observations about killing a cow just before she has a calf is about like this: It never pays to kill a healthy cow just before she has a calf, because the cow and calf will always bring more money, but we frequently have diseased cows which will not improve until they become pregnant—this is often noticed in the human—when just so soon as the calf is born they immediately fall off. Hence, they sell just before the calf is born.

You will see I have been somewhat inquisitive. I think it a subject well worth attention. Respectfully,

GEO. F. GIESE, M. D.

The following was clipped from a Maquoketa, Jackson county, newspaper, dated March 26, 1881:

The other day a gentleman of this city went into one of our butcher-shops and procured a piece of hog's liver, which he took home for the family supper. After being cooked it was partaken of by all the family except the wife, and shortly after, with this exception, they were taken violently ill. A physician was summoned, who applied remedies for poison, and they all recovered in a short time. Suspecting the liver as the cause, a portion of it was given to the dog, which in a few moments exhibited the same symptoms. Upon inquiry it was ascertained that the hog from which the liver was taken had been fattened upon the offal at the slaughter-house, and the animal must have been in a horribly diseased condition to produce such effects. Of course we do not expect our readers will now foreswear swine-flesh upon the strength of this disclosure, but it would perhaps be as well for them, in future, to inquire a little into the antecedents of their pork-steaks and sausages before purchasing

It being the duty of local boards of health to prevent injury or annoyance from anything dangerous, offensive, or unhealthy, and to prohibit or remove anything tending to promote disease, it remains for us then to consider the best methods of securing this end in regard to slaughter-houses, and I would urge in this connection the importance of perfect cleanliness both within and without.

The plan of elevating the slaughtering-rooms so that the blood, offal, etc., may be dropped into wagons in the basements, renders the labor of keeping these rooms clean comparatively easy.

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Care should be given to securing a favorable location with good drainage.

The following suggestions from the report of the State Board of Michigan, I consider excellent, and would recommend that they be adopted as far as practicable by the local boards of our own State, and their requirements insisted upon:

1st. It is desirable, when practicable, and it is believed to be subservient not only to the convenience but also to the pecuniary advantage of those engaged in the business, that all the slaughtering as well as all the rendering, etc., should be done at one place.

2d. Location of slaughter-houses, which should be located on hard dry land that can be well drained:

a. They should be amply supplied with *clean*, *wholesome* water from springs, wells, or unpolluted streams.

b. They should be floored with a tight, solid floor, of hard wood, or of cement or well-joined stone.

c. The yards, sheds, and close pens should be dry and free from mud and filth, and their sides or walls should be thoroughly whitewashed at least twice a year.

3d. The slaughter-house and all its apparatus should be kept in a neat and orderly manner, free from all offensive smells.

a. When the slaughtering for the day is completed, the sides and floor of the slaughtering-room should be thoroughly washed with an abundance of clean water. No other disinfectant will be required.

b. No animal matter of any kind should be permitted to remain in, under, or near the slaughter-house to decompose or putrefy.

4th. When blood and offal are fed to swine on the premises, such arrangement shall be made that those materials shall be speedily consumed, and that the unconsumed portions shall be prevented from giving off offensive smells, as follows:

a. The blood of all slaughtered animals should be conducted by a water-tight gutter to a water-tight trough in the hog-yard.

b. The offal should be thrown into a pen with a tight dry floor, to be consumed at once by the swine; and all portions not consumed within twenty-four hours should be removed from the pen and should be burned, buried, or composted with fresh earth.

5th. When the blood or offal are not fed to swine on the premises, they should every day be carted off in close tanks, and in other places treated as described in Rule 4, or should be converted into fertilizers, or otherwise utilized by an apparatus, the gases arising from which should be carried under the furnaces and consumed.

6th. The heads, legs, and other bones may be treated as follows: They should be properly utilized within forty-eight hours, or shipped as often at least in the summer as once in two days.

7th. The fat, and all materials from which fat or oil is to be extracted, should be rendered within such time after the slaughtering of the animals that no offensive odors shall arise from them or from the process of rendering.

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It is believed that slaughter-houses of every capacity, carried on in accordance with the foregoing rules and regulations, will be so free from offensive smells as not to be injurious to the health of any one.

If all slaughtering could be done at one place, much unnecessary expense could be saved,

1. As better apparatus could be secured at less cost for one than for two or more.
2. Sheds and stabling would be less expensive for one than for more.
3. Proper drainage could be procured for one at far less expense.
4. Abundance of water could be supplied more cheaply.

There are many other advantages that might be mentioned, but one of the greatest being a common ice-room or cooling-room where dressed meats could be allowed to hang for a season, until ready for use.

I append a draft of the butchers' refrigerator in use at Dallas Center, for which I am indebted to James L. Loring, Civil Engineer of our State Board. I heartily concur with him in the opinion that every butcher-shop in the land should possess a similar one.

All of which is respectfully submitted.

PHILIP W. LEWELLEN, M. D.,
Committee on Slaughter-Houses.

DALLAS CENTER, IOWA, November 16, 1880.

Dr. P. W. Lewellen:

DEAR SIR—I enclose you a draft of our butcher's refrigerator. I think it will explain itself. They have six acres, a mile from town, on which is their slaughter-house. The beef is raised by a windlass; all the blood goes into a large box-trough and runs through a smaller trough into the hog-yard trough. They keep a lot of hogs, and in a half-hour there is neither offal nor blood left. No meat is allowed to hang in the house, but the dray is right there and the meat is brought up and hung in the inner room of the refrigerator, marked "A" on the plat. There is a constant circulation of air, as the direction of the arrow will show you, and we never have a pound of tainted meat in this town. The thermometer hangs inside the glass window of the outer room, and in the hottest days at 98° outside the refrigerator is about 50° and below. If I had the power, I 'd legislate one of these refrigerators into every butcher-shop in the land. Hope it may satisfy you.

Yours truly,

JAMES L. LORING, *C. E.*

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GLANDERS

IN

MAN AND DOMESTIC ANIMALS,

BY

L. F. ANDREWS,

SECRETARY OF THE

STATE BOARD OF HEALTH

FOR THE YEAR 1880.

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GLANDERS IN MAN AND DOMESTIC ANIMALS.

The frequency of reports from various sections of the State of the presence of glanders among horses, leads to the conclusion that its prevalence is alarmingly wide-spread, as the result of a want of knowledge of the disease, and the primary symptoms by which it may be detected before infection has been had by a large number of animals. The author of this paper makes no pretension to veterinary knowledge, or claim for new facts to those already existing relative to glanders. His only purpose is to compile the most important and well-established facts, that the public may have a better understanding and appreciation of the nature of this, one of the most loathsome and dangerous diseases known. It only needs to be fully known to be avoided with horror.

HOW TO DETECT GLANDERS IN HORSES.

Dr. H. J. Detmers, V. S., of Chicago, in his report on the Investigation of Diseases of Domestic Animals, to the United States Department of Agriculture, gives the following definition of the different forms of glanders, which appears in a special report, No. 12, of that Department, 1879, page 257:

Glanders is a contagious disease *sui generis* of animals belonging to the genus *equus*. It has usually a chronic course, can be communicated by means of its contagion to several other species of animals and to human beings, and must be considered incurable if fully developed. The principal seat of the morbid process is usually in the mucous membrane of the nasal cavities. Three main symptoms, viz., discharges from the nose, swelling of the submaxillary lymphatic glands, and particularly ulcers of a peculiar, chancrous character in the mucuous membrane of the nose, characterize glanders, and are, therefore, of the greatest diagnostic value. Wherever these three symptoms, or only two of them, are present and fully developed, there the diagnosis is secured. But unfortunately this is not always the case; sometimes two, and even all three, principal symptoms may be wanting, and still the horse may be affected with glanders. In such a case the seat of the morbid process is not in the nasal cavities, but further on in the respiratory passages, or even in the lungs. Several such cases have come to my observation, and have also been described by others, especially by Professor Gerlach. In still other cases, in which the disease might be called "external glanders," but is better known by the name of "*farcy*," the morbid process has its principal, or even its exclusive, seat

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in the subcutaneous connective tissue and in the skin or cutis. The late Professor Gerlach, in his treatise on Glanders, published in the "*Jahresbericht der Konniglichen Thierarzneischule zu Hannover*, 1868, discriminates, in consequence of these differences, three distinct forms: Nasal or common glanders, pulmonal glanders, and farcy. As such a division of glanders proper into nasal pulmonal glanders—farcy is described by every author under a separate head—facilitates considerably the diagnosis, and explains also at once why just those symptoms which are usually looked upon as most characteristic remain sometimes imperfectly developed, or entirely unobserved, it will be convenient to adopt Gerlach's classification.

1. NASAL GLANDERS.—This form is that which is most common, best known, and characterized by the three principal symptoms which have been mentioned.

(*a.*) *The discharge from the nose*, although the most conspicuous of those three symptoms, is really the one which is the least characteristic, or of the least diagnostic value, because several other diseases of the respiratory organs are also attended with discharges from the nose, which are more or less similar. It is true, the discharge in glanders possesses some properties which, if considered as a total, are characteristic and are not found combined in any other disease; but the difficulty is, one or another of these qualities is not always sufficiently developed. Consequently, if the two other principal symptoms, the swelling of the lymphatic glands and the ulcers in the nose, are absent or not observed, the discharges from the nose are seldom characteristic enough to serve as the sole basis of a reliable diagnosis. The same are frequently one-sided, and, according to most authors, oftener from the left than from the right nostril. According to my experience, they are nearly, if not quite, as often from the right as from the left nasal cavity, and, at any rate, just as often from both nostrils as from one only, but always more abundant from one, either right or left, than from the other. At the beginning the discharges are usually thin, almost watery, frequently greenish, or somewhat similar in color to grass juice; afterward the same appear to be composed of two different fluids, one yellowish and watery and the other whitish and mucous. Still later the discharges become thicker, more sticky, exhibit frequently a mixture of different colors, are sometimes greenish, sometimes dirty white or grayish, contain not seldom streaks of blood, and, in advanced stages especially, particles of bone or cartilage. They have a great tendency to adhere to the borders of the nostrils and to dry there to dirty yellow-brownish crusts. As to quantity, the nasal discharges in glanders are seldom very copious, at least not as copious as in many other diseases—strangles, for instance. The quantity, however, varies. Sometimes, especially when the weather is warm and dry, the discharges may be very insignificant or be absent altogether, and, at other times, particularly if the weather is rough, wet, and cold, will increase in quantity and become comparatively abundant. Several authors have attached special importance to one or another of the various properties as something characteristic, by which the nasal discharges in glanders can be distinguished from those of other diseases, but, in reality, none of those properties are constant enough, or belong exclusively to glanders, to be alone of great diagnostic value. Solleysel and Kersting considered the stickiness as such a characteristic, but the discharges in strangles are frequently just as sticky. Pinter and Vilet relied upon the specific gravity; they found that the nasal discharges of glanders,

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which consist partly of matter and partly of mucus, sink to a certain extent in water, while the mucous discharges of distemper swim on the surface. This test is of some value, but is not decisive, because matter is sometimes admixed also to the nasal discharges of other diseases. Others have laid stress upon the one-sidedness of the discharge, but the latter is just as often from both nostrils as only from one, and a one-sided discharge belongs also to some other diseases; is, for instance, observed in a catarrhal inflammation of one of the frontal maxillary sinuses, if cavities in one of the three last molars of the upper jaw have effected a fistulous opening into the maxillary sinus, if a polypus has developed in one of the nasal cavities, etc. Professor Gerlach considers the greenish color as a very important characteristic, but that, too, is not reliable, because it is not constant, is usually observed only at the beginning, and belongs frequently, also, to the nasal discharges of catarrh, strangles, and influenza, if the patients are kept on green food or in a pasture. The nasal discharge constitutes a characteristic symptom of glanders only, if all its essential properties are present (sufficiently developed), and are considered as a whole. If the other principal symptoms (swelling of the lymphatic glands and ulcers in the nasal cavity) are absent or remain unobserved, some minor symptoms, which may happen to be present, and the absence of all such symptoms which are peculiar to other diseases, make frequently a diagnosis possible.

(*b.*) *A distinctly limited swelliny of the submaxillary lymphactic glands* constitutes the second essential symptom, which is more characteristic of glanders, and of greater diagnostic value than the discharge from the nose. The swelling corresponds to the discharge; that is, the latter is one-sided, for instance, from the left nostril only, the glands of the corresponding left side of the head are affected, and if the discharge is from both nostrils the glands of both sides are swelled, but always those of that side the most on which the discharge is most copious. The swelling does not exhibit any conspicuous sign of inflammation, and is usually not painful, except at the beginning or after a sudden increase of the morbid process. It is always distinctly limited, and the swelled gland is always hard and usually of the shape and size of a peanut; may occasionally, however, be found as large as a hen's egg. Large inflammatory swellings without distinct limits do not belong to glanders. At first the swelled glands are more or less movable beneath the skin, but afterward, in an advanced stage of the disease, the same frequently appear to be attached more or less firmly to the bone and are immovable. The swelling, unless irritated by external causes, never dissolves in suppuration like the inflammatory swellings common in distemper, and is absent only if the lymphatic glands have been extirpated, if the lymphatics have become obliterated, or if the morbid process in the mucous membrane of the respiratory passages is situated too high to be within the province of those lymphatics which are connected with the submaxillary lymphatic glands, for the swelling is caused solely by a deposit of deleterious matter which has been absorbed by the lymphatics. Professor Gerlach looks upon every horse as probably affected with glanders which shows a distinctly limited, hard, knotty, and painless swelling of the submaxillary lymphatic glands. I will not contradict a man of his experience and learning, and admit that such a swelling constitutes a very suspicious and characteristic indication of glanders, especially if some other symptoms of the disease are also present; but I am obliged to remark

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that I have seen horses not affected with glanders in which those glands were swelled to the size of a peanut, and were hard, without pain, and movable.

(*c.*) *Ulcers of a peculiar, chancrous character* on the mucous membrane of the nose, and especially of the septum or cartilaginous partition between the nasa cavities, constitute by far the most characteristic symptom, and, in fact, the only one which makes the diagnosis a certainty, even if all other symptoms should be absent or imperfectly developed. Still, such is never the case; if there are ulcers in the nose, there is also a discharge of matter mixed with mucus from the corresponding nostril. In some cases the ulcers are present, but are situated too high to be seen unless the horse is examined in bright sunlight and the rays of the sun are reflected by a mirror into the cavity of the nose. The seat of the ulcers is usually on the septum and near the nasal bone. Their size and shape vary. Some ulcers are small, isolated, almost round; others are large, of an irregular shape, and of uneven depth. All produce matter, have elevated, corroded borders, a dirty, steatomatous-looking bottom, and are never covered with a scab. At first small gray specks or elevated gray spots (glanders-nodules), varying in size from that of a pin's head to that of a pea, make their appearance. These nodules soon decay and form ulcers. Gradually the ulcers increase in size and depth; their borders become more elevated and corroded; the process of decay goes on; and if two or more small ulcers are close together, they become confluent, unite, and constitute one large, irregularly-shaped ulcer, which continues to increase in size and depth. Decay and destruction work their way deeper and deeper, even to the cartilage, and if ulcers happen to be existing in both cavities, or on both sides of the septum, it occurs not seldom that the latter becomes perforated. I observed several such cases, one especially in Lee Centre, Lee county, Illinois, in 1866, in which the hole in the lower or anterior part of the septum was fully as large as a silver half-dollar. The borders of the same appeared irregular, corroded, much swelled or elevated over the surface of the septum, and coated with a dirty-looking, discolored, and blood-streaked glanders-matter. The disease, in this case, was far advanced, and the animal about ready to die.

Sometimes it happens that a glanders-ulcer shows a tendency to heal; it loses its chancrous character; granulation makes its appearance; a scurf or scab is formed; a healing takes place, and a fibrous, whitish-colored, somewhat puckered or star-shaped scar is left behind.

Some authors have attached considerable diagnostic importance to a bluish or lead-gray color of the nasal mucous membrane, and to bluish or lead-gray spots, which usually make their appearance before it comes to ulceration. Such a bluish color, however, is not a constant symptom—in some cases only small red specks can be seen on an otherwise rather pale mucous membrane, and is not characteristic either, because it is observed also in catarrhal diseases, and in horses driven against the wind in cold weather.

(*d.*) *Minor symptoms.*—The three principal symptoms just described are usually accompanied by some others of minor diagnostic value, but under certain circumstances very important, especially if one or another of the principal symptoms should happen to be imperfectly developed. As such minor symptoms, may be mentioned,

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First, An accumulation of a glassy, whitish-gray mucus in the inner canthus or corner of the eye of the diseased side of the head. It is a symptom which usually makes its appearance at the beginning of the disease.

Second, A lusterless, dry, and dirty-looking, or so-called "dead" coat of hair.

Third, More or less difficulty in breathing.

Fourth, A peculiar short and dry cough, somewhat similar to the well-known cough of a horse affected with the heaves.

These last three symptoms, of which the cough is the most characteristic, make their appearance only after the morbid process has made considerable progress. In some cases the plain outbreak of the disease, or the appearance of the plain and unmistakable symptoms, is preceded by a swelling of the inguinal, the axillary, and other lymphatic glands.

The difficulty of breathing, and the peculiar and somewhat characteristic cough, though only minor symptoms in common or nasal glanders, rise to great diagnostic importance if the morbid process has its principal seat in the lungs, instead of the mucous membrane of the nasal cavities—if, in other words, the animal is affected with that form of the disease which Professor Gerlach has called "*pulmonal glanders*."

It happens sometimes that a horse is affected with glanders and communicates the disease to other healthy animals, but does not itself show any of the three principal symptoms characteristic of that disease; has no discharge from the nose, no swelled glands, or ulcers in the nasal cavities. The late Professor Spinola, in his lectures on veterinary pathology in Berlin, related such a case to his students, which will serve as an illustration. It is substantially as follows: In a village near Berlin glanders broke out in a stable in which several horses were kept. A veterinary surgeon was called, who made an investigation and condemned every horse that showed any symptoms of the disease, and every animal condemned was immediately killed. The horses apparently not affected were kept for several weeks under police control, and from time to time inspected, but finally released. Among them was an old sorrel horse which had the heaves, and which had been brought into the stable a short time before the first case of glanders made its appearance.

This old sorrel mare was sold several times, and in each stable where she was kept the horses were soon after her arrival condemned, though she escaped. Finally she came with other horses before Prof. Spinola who condemned her. The *post-mortem* examination revealed that the old sorrel mare which had the "heaves" was affected with pulmonal glanders in a very high degree, and had been the cause of the death of several valuable animals.

In pulmonal glanders the morbid process has its principal seat in the lungs, and may remain limited to the latter for months, and even for one or two years; and during that time, or as long as the morbid process is confined to the lungs, no prominent symptoms may make their appearance except such as are usual attendants upon heaves—some difficulty of breathing, and a peculiar short, weak, and dull cough, which must be heard, but is not easily described. Finally, however, but not before the disease has made considerable progress, the difficulty of breathing increases, more or less discharge from the nose makes its appearance, emaciation sets in, the natural glossiness of the coat of hair disappears and becomes rough, stands

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on end, and exhibits a so-called dead and dirty-looking appearance. The skin, too, loses some of its natural elasticity, and the animal becomes "hide-bound."

As the principal symptoms of pulmonal glanders are essentially, for some length of time at least, only such as are also observed in common cases of heaves (one of the most frequent disorders of horses), the diagnosis must frequently be based, as a lawyer would say, upon circumstantial evidence.

A horse must be suspected of being affected with glanders;

First. If the peculiar, weak, and dry cough constitutes, compared with the difficulty of breathing, the predominating symptom; if the animal becomes more and more emaciated and hide-bound, and if the appearance of the coat of hair is such as to indicate the presence of a cachectic disease.

Second. If it is known that the animal in question has been exposed to the contagion.

Third. If other horses have become affected with glanders or farcy, after having been together with the animal that shows those symptoms.

Fourth. If a horse apparently affected with heaves has previously exhibited other symptoms, more or less characteristic or suspicious, of glanders.

Fifth. If other symptoms, such as are observed in so-called "nasal gleet," or incipient nasal glanders, make their appearance.

Farcy, or external glanders.—The name "farcy" is given to such cases of glanders in which the morbid process has its seat in and immediately beneath the skin and in which nodules, boils (glanders-buboes), and ulcers of a very infectious and chancrous character make their appearance in the subcutaneous tissue, and in the skin itself. Glanders-nodules and lenticular ulcers in the tissue of the skin, smaller and larger open ulcers penetrating the same, a strand-shaped swelling of the subcutaneous lymphatics, swelled lymphatic glands, and œdemata, the latter especially in the legs and on the head, constitute the most essential symptoms.

Professor Gerlach discriminates two forms; subcutaneous glanders or common farcy, and exanthematous glanders or skin farcy.

(*a.*) *Subcutaneous glanders or common farcy.*—The morbid process in this rather frequent disease has its principal seat in the subcutaneous connective tissue, and in the lymphatic system of the skin and between the skin and the muscles, but especially on the inner side of the hind legs, on the hips, on the neck, between the fore legs, and on all such places where the skin is thin and fine. At first distinctly limited swellings of an inflammatory character (incipient boils or glanders buboes) make their appearance in the subcutaneous tissue. These swellings or boils soon commence to dissolve, or to decay, from within; the ulceration begins in the center, but the matter, being very corrosive, soon works its way into the skin, the boil finally opens, and presents a farcy-ulcer with a steatomatous bottom, and elevated, corroded, and inflamed borders. At the same time, or even before the formation of the first ulcer has become completed, deleterious matter is absorbed by the nearest lymphatics, and deposited in the lymphatic glands. The former, in consequence, swell to hard and plainly visible cords or strands, and the latter to painful and distinctly limited tumors. The partial or total closing of the lymphatic vessels and glands thus effected interferes with, and even prevents, a performance of their functions, or stops the absorption of lymph, and œdematous swellings, more or

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less extensive, are the necessary consequence. The same make their appearance especially if the seat of the morbid process is on the inside of a leg, and if either the inguinal or axillary glands are swelled and closed by a deposit of deleterious matter. The more extensive and complete the swelling and closing of the lymphatic vessels and glands, or the more lymphatics are affected, the more extensive is also the œdema. Lameness, usually caused by such an œdema, is also a frequent attendant.

The roundish boils or tumors increase in size from that of a hazel-nut to that of a hen's egg. At first, when such a boil is making its appearance, it is not fastened to the skin; the latter can yet be moved a little in every direction over the boil, but soon the neoplastic process and the subsequent decay will extend to the tissue of the skin, and boil and skin will become firmly united before the ulcer breaks and discharges its extremely infectious and corrosive contents, consisting of decaying glanders-cells or matter, and lymph.

(*b.*) *Exanthematous glanders, or skin farcy.*—In this form of glanders or farcy the principal seat of the morbid process is in the tissue and in the lymphatics of the skin or cutis. It is a rare form in horses, but the only one in which external glanders or farcy makes its appearance in a human being. Distinctly limited swellings (nodules and tumors) of the size of a pea to that of a hazel-nut, either isolated, or united and resembling a string of beads, make their appearance in the tissue of the skin. These swellings soon break, and then present round ulcers with elevated and corroded borders. The discharge consists of a mixture of matter, composed mainly of decayed glanders-cells and lymph. In other, though rather rare cases, the swellings are very small and numerous, and present themselves as small nodules, some of which are so small as to be scarcely visible, while others are about as large as common peas. These small swellings, too, are soon changed to ulcers, which are usually flat, lenticular, and constantly suppurating. If close together the same becomes frequently confluent.

On the human skin, not being covered with hair, the whole process can be observed much better than on the skin of a horse.

Nasal Gleet.—This is a name which I have accepted only with great reluctance, because it signifies no definite disease, and is used frequently to cover ignorance, fraud, and crime. It can be retained only if applied exclusively to such cases of disease (usually occult or incipient glanders) in which the horse has a suspicious-looking discharge from the nose, but shows no other characteristic symptoms sufficiently developed to base upon them a sure diagnosis. So, for instance, it may happen that a horse has a chronic discharge of matter and mucus from one or both nostrils, and perhaps, also, a distinctly limited swelling of the submaxillary lymphatic glands, and yet neither the discharge nor the swelling may be sufficiently characteristic to justify the belief that the horse in question is affected with glanders, because the latter is a disease which, for obvious reasons, demands a correct and positive diagnosis. To declare that a horse has glanders is equal to condemning the same to be killed. The term "nasal gleet," therefore, is convenient and admissible, if used exclusively to signify a disorder of the respiratory organs attended with suspicious discharges from the nose, and other symptoms common in glanders, but not yet fully enough developed or sufficiently characteristic, one way or another,

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to make the existence or absence of glanders a certainty. Such a disorder, of course, must be considered as incipient or occult glanders till every doubt has been removed.

CHRONIC AND ACUTE GLANDERS.—Glanders, as a rule, is a chronic disease. The morbid changes develop slowly. Of the various forms in which the disease is able to make its appearance, pulmonal glanders, unless complicated with one of the other forms, or with other inflammatory or feverish diseases, is the most chronic, or takes the longest time to produce conspicuous symptoms and to become fatal. It takes frequently two or three years before the animal succumbs. Nasal glanders is usually not quite so slow in its progress; still it also very often takes half a year longer before the morbid process makes sufficient headway to produce plain, unmistakable symptoms, or before the chancrous ulcers, characteristic of glanders, make their appearance in the mucous membrane of the septum of the nose. Farcy, or external glanders, is usually the least chronic (comes the soonest to a termination) of the various (uncombined) forms of glanders. Plain and unmistakable symptoms (veritable farcy-ulcers) make their appearance almost always within three months and frequently within a week or two after the infection has taken place. In mules and asses, however, the various forms of glanders are usually less chronic, make a more rapid progress, are more destructive, and come sooner to a termination than in horses. The progress of the morbid process depends also to a great extent upon the constitution and the organization of the animal and the mode and manner in which it is kept. Weather and temperature, too, have considerable influence; warm and dry weather usually retards, and cold, wet, and stormy or inclement weather usually accelarates and spreads the morbid process. Most authors discriminate between acute and a chronic form of glanders. From a practical standpoint such a distinction is perfectly admissible, but to separate acute and chronic glanders as two different diseases, as has been done by some (French) authors, must lead, and has led, to very dangerous mistakes and to great confusion. Every form of glanders, as I have said before, is naturally—*ei ipso*—more or less chronic in its course, but may become acute, either from the first beginning or at any stage of its development, and sometimes very suddenly.

Wherever glanders presents itself as an acute disease, either an uncommonly large quantity of the contagion has been introduced at once and brought in direct contact with the blood, or a complication of some sort has been effected.

Dr. Ballinger, in an article on Glanders, uses the terms "chronic" and "acute" to distinguish the different developments of the disease. He says: "Although the chronic form often has an acute termination, the acute form is never transformed into the chronic. In acute glanders, whether in that form which if developed from the chronic, or in that which appears at the outset as such, there is to be seen, joined with marked febrile appearances, an excessive hyperæmic swelling of the mucous membrane of the nose, upon which, in the course of a few days, numerous tubercles, ulcers, and infiltrations may be made out. The nasal secretion is of a yellow tinge, viscid, and often san-

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guineous. The ulcers spread rapidly, even in the direction of the air-passages, and in the neighboring lymphatic glands and vessels, the changes peculiar to lymphangeitis (inflammation of the lymphatic vessels), and lymphadenitis (inflammation of lymphatic glands), may be found. There are frequently seen "cords" in the scalp, which in some places may be ædematous (swelling produced by the accumulation of serous fluid). As the fever and prostration increase, the nodules and ulcers often appear in other portions of the body, accompanied by ædamatous swelling of the extremities, the lower portion of the abdomen, and the breast. The animal grows thin, and after an illness varying in length from eight to twenty-one days, death ensues."

Dr. Charles H. Fisher, Secretary of the Rhode Island State Board of Health, in the annual report of that board for 1879, gives the following characteristic symptoms of glanders, in plain terms, comprehensible to the general reader:

ACUTE GLANDERS.

"The acute form is characterized by high fever, loss of appetite, thirst, shrinking of flesh, skin dry, hair standing out, pointing away from the body, the temperature of the mouth or rectum rising from 104° to 109° F. Trembling and shivering also are present, dependent in frequency and degree on the severity of the disease. The urine is usually very much increased in quantity, is clear and thin; the breathing, which runs up to forty, and even to sixty respirations per minute, is hard and labored; the pulse is quick and weak, while the heart can be felt and heard beating strong and loud. The lining membrane of the mouth has a saffron redness, and that of the nostrils is crowded with dark-colored blood, and sometimes thickened by swelling.

"After three or four days the fever begins to subside, and then there appear, in patches spread in scattered spots over the lining of the nostrils, little pimples, from the size of a pearl barley to a pea, having a bright red border, and a light-colored spot in the center. These pimples ulcerate, and within forty-eight hours leave a depression or pit, with ragged edges, about one-eighth of an inch deep, and with granulations like what is called "proud flesh" at the bottom. These pits grow wider gradually, or run together until they cover almost the entire surface of the nostrils in one continuous ulcerating sore, having a preference to the partition of the nostrils, which may be, in rare instances, perforated through and through. A greenish hue of the

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diseased surface will indicate when mortification and perforation are taking place.

"At the time of the appearance of the pimples, there will also be a copious discharge from the nostrils, of a thin, yellowish, sticky fluid, not unlike that which occurs in catarrh from taking cold. This discharge gradually becomes thick, varying in color, sometimes streaked with blood, and having the characteristics of matter from an abscess. The quantity is increased, rather than diminished.

"At this time, also, the glands of the lower jaw become swollen and somewhat painful, especially from pressure. At first pliable and soft, they soon become hard, rigid and immovable. The inflammation of the nostrils extending to the throat and windpipe, occasions a dry, short, harsh cough, apparently painful, and often harassing.

"Pustules, or pimples, sometimes appear in the windpipe, and greatly increase the difficulty of breathing, and the cough.

"In some cases the joints swell, and become very sore and painful. 'Farcy buds,' so-called, which are small tumors, varying in size from that of a pea to a walnut, appear in or beneath the skin in various parts of the body, but more particularly where the skin is thinnest, as on the inside of the thighs and legs, beneath the abdomen and around the face. These ulcerate, sooner or later, and add to the distress of the animal, already overburdened with suffering.

"The lungs frequently become inflamed, deposits of glanderous matter resembling tubercles occur in them, which cause ulceration, increase the difficulty of breathing, and hasten the fatal result. Death occurs in from five to twenty days, according to the severity of the disease, and is usually preceded for a day or two by a return of the fever which ushered in the disease, and then temporarily subsides.

CHRONIC GLANDERS.

"The first notice of the presence of chronic glanders is usually a continuous discharge from one or both nostrils. There is a form of the disease, however, called "dry glanders," in which the discharge is very slight, and, therefore, unnoticable; but the cases are exceedingly infrequent. At the commencement, the discharge is thin and clear, but later the transparency entirely disappears, it becomes heavier and more tenacious, crusting within, and just outside the rim of the nose, and dripping slowly, or blown in thickened masses from the nostrils. The discharge is at first, small in quantity, but becomes more abundant as the disease progresses. The crusts that form around the nostrils, and

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upon the lips, have a soft, oily feeling when pressed by the finger, but notwithstanding the greasy feeling, will usually adhere to any substance with which they come in contact. These crusty accumulations have a dark brown, or mahogany color. After an indefinite period of time, depending on the severty of the disease, the discharges assume the appearance of pus, or matter from a running sore. If the disease is to take on a rapid progress the discharges appear like those in acute glanders, becoming thicker, bronzy in color, and sometimes streaked with blood. This is owing to more rapid extension of the ulceration in the cavities of the nostrils. When the disease progresses more slowly, the discharges are of a light green tint, and continue of that color, until more rapid ulceration, or the last stages of the malady occur.

"The discharges from the nostrils are not always offensive on account of an inherent fetid smell; the disagreeable odor noticed, in most cases arising from a retention of the matter, and its natural purefaction in contact with the air and the breath of the animal.

"At the commencement of the disease, if the forefinger be made to sweep around the internal surface of the nostril, there will be felt little protuberances, as though shot were imbedded in the lining membrane. Or, if the rim of the nose be turned over the thumb or finger, there will be seen little oval, or roundish elevations on the surface of the lining membrane, about the size of an ordinary pepper-corn, and of a deep straw color, while the lining membrane just around them is whitish and glistening as if polished. In the acute form of the disease, the membrane that borders the pustule is a bright red. These ulcerate in a few days, a small quantity of matter is discharged, and a pit is formed as in acute glanders. These pits are not usually more than half a dozen in number, do not spread by ulceration *so rapidly* as in the acute form of the disease, and instead of being of a bright red color, are nearer the color of rough slate, or sheet lead. The edges are also harder and form an elevated rim around the pit, and the surrounding tissues and base of the pit are hard and gristly.

"The ulcerating sores are frequently alluded to under the term of 'glander chancres,' having a resemblance, in their first stages to chancres of syphilis. They increase in diameter slowly but steadily, and when there are several in near proximity, they often run together, as in acute glanders, and form one large ulceration having, however, the same hardened outer border. In some rare instances, and under favor-

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able circumstances the chancres heal, leaving white, circular scars in place of the pits. Such an occurence should not be regarded as evidence of the extirpation of the disease, but simply an effort of the system to repair its losses, assisted by rest, nourishing diet and the best of attention in every way. The healing of the chancres may go on also, while the disease is active elsewhere, as in the deposition or development of glanderous tubercles in the lungs. But the glander chancres will appear again in the nostrils, and continue on to destructive ulceration.

"After a variable length of time the glands between the jaws become enlarged. If the chancres are present upon, or within one side of the nostrils, the glands are usually swollen only on the same side. The enlargements vary from the size of a filbert to that of a middling sized peach. For a week or two after the glands become swollen they are tender upon pressure, and feel like putty enclosed in a thick, woolen, cloth. They then gradually acquire a firm, strong feeling, uneven over the surface, become bound to the parts around them, and frequently immovably fixed to the jaw-bone and skin. These glandular swellings never become running sores.

"Many horses are not suspected of having glanders until attention is called to their condition by some disability; as for instance, swelling of the joints, and fleshy parts of the legs with consequent lameness, general weakness, hurried breathing, nose-bleed, persistent cough, loss of flesh, etc. And cases occur occasionally, in which none of the outward symptoms of glanders appear, the disease being located wholly in the internal organs, as the lungs, liver, spleen and glands of the bowels.

FARCY.

"This term simply distinguishes a form of glanders in which there is a local development of the skin in the form of tumors in and beneath the skin. These appear more or less rapidly one after another, according to the severity of the general disease, and vary in size from that of a pea to that of a walnut (hickory nut). They ulcerate sooner or later, and become eating and spreading sores, with ragged borders, and surrounded by hardened ridges of flesh, with a marked depresssion in the center, from which large quantities of matter are discharged.

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FARCY CORDS.

"After farcy buds appear there also may be seen long, straight, narrow ridges, as though a small rope lay beneath the skin. These, farcy cords, as they are called, always run from a farcy bud to the nearest lymphatic ducts, or pipes inflamed by the glanderous poison. They often become chains of farcy buds which develop in them, and which, in turn ulcerate and pursue the same course as the original farcy buds."

SPECIFIC CAUSE AND ORIGIN OF GLANDERS.

Dr. Detmers gives the following as the specific cause and origin of glanders:

The contagion must be considered as the exclusive cause of glanders. When I lived in Dixon, Lee county, Illinois, from the fall of 1865 to September, 1868, I had an opportunity of observing numerous cases of glanders. A friend of mine, D. W. McKinney, dealer in horses and proprietor of a livery stable, knew nearly every horse in the whole county, and taking special interest in those cases of glanders, assisted me in inquiring into the history of every horse affected. As a result, every case, without exception, was traced back to an infection by condemned United States army horses that had been sold to the farmers.

The contagious principle is developed during the very first stages of the disease, and even before plain symptoms have made their appearance.

Notwithstanding all those cases of apparent deuteropathic (secondary) development of glanders, which can be found in the veterinary literature of nearly every country, I am not afraid to say I do not believe that a case of real deuteropathic glanders, one that can stand a thorough and unbiased investigation, has ever occurred. Gerlach, in his treatise, says: "A genuine development, protopathic (first) and deuteropathic (secondary) must be considered as not proved."

Nobody has ever succeeded in producing glanders by merely exposing or subjecting a horse that has never been exposed to the influence of glanders-contagion to any or to all the injurious agencies and influences which have been mentioned as being accused as the cause of protopathic glanders. In the West, where I have lived and practiced during the last thirteen years, glanders, as I have been informed by reliable persons, used to be an almost unknown disease before the civil war, but has been spread by condemned army horses during and immediately after the war, and is now frequent and can be found everywhere.

The veterinary school of Lyons, France, has always kept aloof from the errors of the Alfort institution in regard to glanders, and has never denied the contagiousness of that disease.

The German veterinarians, though differing at times considerably in opinion as to the nature of glanders, have never doubted its contagiousness; and German governments have always been very strict in taking the most effective measures against the spreading of that terrible enemy of the equine race by requiring a prompt destruction of every horse reported by a veterinary surgeon as being affected

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with the disease. As a consequence, glanders has become a rare disease in Germany, and the annual losses are very insignificant.

Drs. John R. Page and J. J. Terrell, of Virginia, in their report on glanders which appeared among horses in the quartermaster's department of the Confederate army, say:

"The principle of contagion in glanders, whether strong or weak, is admitted by all ancient and modern observers."

"The contagion, once generated, multiplies itself without any assignable limit, as the smallest spark may spread the greatest conflagrations." The term is here used in its *specific sense*, meaning the direct transmission of disease by means of a specific virus, from one animal to another, by artificial or natural inoculation, as in the case of smallpox, syphilis, and hydrophobia, contradistinguished from the term *common contagion* or *infection* as applicable to measles, in man, and epizootic and distemper in animals. But we do not mean to deny the fact of its occasional propagation by common contagion or infection."

HOW IT IS COMMUNICATED AMONG HORSES.

Ziemssen's Cyclopædia, Vol. III, says:

Thus far, observations have failed to determine the exact mode in which the virus of glanders penetrates the system. It is believed that virus having become attached to the mucous membrane or the unbraded skin, sets up at first at that point a local process, and thence forces its way subsequently into the remainder of the economy. It is a well authenticated fact that contagion is often produced by bringing in contact diseased and healthy animals, and, furthermore, by placing sound animals in stalls that have been previously occupied by those diseased.

We are forced to admit the possibility of the *absorption* of the *virus together with the inspired air*, and in many instances, also with the food.

We are justified in concluding that, in a large proportion, possibly a majority of all cases of glanders, *volatile infectiny virus* has found its way into the economy, together with the inhaled air, producing either a primary blood-poisoning with secondary specific phenomena in the trachea, larynx, and upper portions of the nasal cavity, or primary nodules and ulcers in the lungs, followed subsequently by the symptoms of general poisoning. The mucous membrane of the nose may, indeed, be primarily infected when that part happens to be the seat of a wound or erosion.

It has been determined that the virus of glanders in the form of a *fixed infectious material* may be found not only in the secretion from the nose, the solid and fluid contents of the nodules and ulcers, but also *in the blood*, and in the *secretions* and *excretions of the diseased body*, as the tears, saliva, sweat, urine and milk.

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Gerlach says:

The communication of the morbid poison by means of external media, especially the harness, has been frequently observed. Some cases are also known in which the disease was communicated by the act of *coitus*, by *suckling*, by *hereditary transmission*, and finally by the *absorption of the poison together with the food.*

The Boston *Ploughman* of March 2, 1878, says:

Horses occupying a different stable from that of the affected animal have been known to contract and die of the disease; and this, too, in face of the fact that they were never brought in contact with each other. And yet, with a full knowledge of the risk they run, some men are foolhardy enough to keep a glandered horse on their premises, prompted by the vain hope of being able to cure the patient of the disease.

Dr. Youatt, in his treatise on the horse, says:

One horse has passed another when he was in the act of snorting, and has become glandered. Some fillies have received the infection from the matter blown by the wind across a lane, when a glandered horse in the opposite field has claimed acquaintance by snorting. It is almost impossible for an infected horse to remain long in a stable with others without irreparable mischief.

That animals showing but slight symptoms of the disease may communicate it, is abundantly proven by Dr. Detmers, who cites many cases within his own practice and observation. He also gives the following marked example, as related by Professor Spinola, in a lecture on veterinary pathology at Berlin:

In a village near Berlin glanders broke out in a stable in which several horses were kept. A veterinary surgeon was called, who made an investigation, and condemned every horse that showed any symptoms of the disease, and every animal condemned was immediately killed. The horses apparently not affected were kept several weeks under police control, and from time to time inspected, but finally released. Among them was one old sorrel horse which had the heaves, and which had been brought into the stable but a short time before the first case of glanders made its appearance. This sorrel horse soon after was sold to a man in another village, and came into a stable containing also quite a number of horses. In that stable, too, glanders broke out. A veterinary surgeon (another one) was called, and every horse showing symptoms of glanders was condemned and immediately destroyed. The old sorrel horse, however, which was known to have "the heaves," was again released after some length of time, together with those which had remained exempted, and was sold once more, this time to a man who kept over thirty horses (I have forgotten the exact number) in his stable a few miles from the city. In this last stable glanders likewise made its appearance after some lapse of time, but in that case Professsor Spinola was called. He, too, after a careful investiga-

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tion, condemned every horse that showed any symptom of glanders, and insisted upon condemning also the old sorrel horse, whose history was then unknown to him, notwithstanding that no symptoms of disease, except such as are usual attendants of heaves, could be observed. The owner hesitated to consent to the loss of a horse apparently not affected with glanders, but Spinola insisted upon the condemnation. The *post-mortem* examination revealed that the old horse, which had the "heaves," was affected with pulmonal glanders in a very high degree; and Spinola, after learning the history of the old sorrel, was convinced that the latter had caused the outbreak of the disease in all three stables.

Professor M. Stalker, of the Iowa State Agricultural College, Professor of Veterinary Science, says:

It is a fact not known to every stock-raiser, that an animal may have the glanders for years, and continue to work with little or no inconvenience, and show no very alarming symptoms to one not accustomed to seeing the disease. Yet such is the case, and this renders the disease all the more dangerous, as under such circumstances the symptoms are likely to be attributed to catarrh or some other comparatively trivial ailment. In this form of the disease the contagion is much less active than in the acute form, another circumstance which tends to put at rest the suspicion that may arise in the mind of the owner.

Drs. Page and Terrell, in their report already referred to, say:

Horses recognize and communicate with each other by the sense of smell. It is in this way, perhaps, that the mucous membrane of the nose becomes the first apparent seat of glanders. The glandered horse blows the virus from his nose on everything around him, and the disposition of these animals to recognize animal matter, wherever found, induces the sound horse to investigate the character of the attracting and noxious secretion. He does this by a strong inhalation; the noxious matter is in this way drawn up and retained upon the delicate mucous membrane of the nose, or is perhaps caught by the roughened surface of an abrasion; it finds its proper "nidus" (nest) and multiplies its morbific influence. It is possible a horse may have glanders for several weeks, and even for months, before it becomes an active agent of contagion, from the fact that the disease is often very slow, and insidious on the onset, and it is only when the mucous membrane of the nose becomes covered and irritated by chancrous (cup-shaped) ulcers that the snorting out of the virulent matter exists, every surrounding object then becoming a deposit for the virus.

TREATMENT OF GLANDERS.

Of the probability of a cure of the disease, Dr. Youatt says:

In a well-settled case of glanders it is not worth while, except by way of experiment at a veterinary school, to attempt any remedies. The chances of cure are too remote, and the danger of infection too great. Worse than all, the man who attends the horse is in danger.

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Dr. Detmers give the following as the only safe and rational treatment of a glandered horse:

The only rational treatment of a horse or other animal affected with glanders consists in a proper and effective application, in the right place, of either half an ounce of lead or five inches of steel; and until such treatment is invariably adopted, or made compulsory, there will be no prospect whatever of freeing this country from this loathsome disease, dangerous even to man, in whom, if once infected, it is just as incurable as in horses. * * * *Confirmed glanders must be considered as incurable.*

As a general rule, which, however, suffers apparent exceptions, glanders is frequent in all those countries in which a great many horses are imported, and rare in all those countries in which more horses are raised than needed, or from which horses are exported. * * * That glanders is most frequent in those countries in which numerous horses are imported from other countries. This is an undeniable fact except in regard to those commonwealths in which good veterinary schools provide a sufficient number of thoroughly educated veterinary surgeons, and in which stringent laws enforce the immediate destruction of every animal affected with glanders, prohibit veterinary quackery, and do not allow anybody to keep or to treat a glandered animal unless he is a qualified veterinary surgeon, and gives sufficient bonds to pay possible damages.

PREVENTION OF THE DISEASE.

It is the decision of all writers upon glanders, that complete extermination is the only sure prevention against the disease. Dr. Detmers says:

As to a medical treatment, there is scarcely a remedy known in the whole materia medica that has not been used against glanders, but, so far at least, with very poor success. It is true a great many *pretended* cures are on record. But if the slow or chronic progress of the morbid process, its frequent remissions in warm and dry weather, exacerbations in rough, cold, and inclement weather and in a foul atmosphere, and the great confusion that has prevailed in regard to the true nature of glanders are taken into consideration, it is no wonder that mistakes and deceptions have occurred. Some of the cases that are said to have been cured have been no glanders at all, and in others the pretended cures have been only temporary—a mere remission. *Confirmed glanders must be considered as incurable;* and it would, therefore, be for the benefit of every one if our general government (Congress) enact a law which should make it a criminal offense to keep and to use a horse, or any other animal, known to be affected with glanders. Any attempt to cure should be strictly forbidden, because a prompt and immediate destruction of every animal affected with glanders, a disease which spreads only by means of its contagion, constitutes the best, surest, and cheapest, and in fact the only prevention.

A successful prevention of glanders is possible only if the contagion—which,

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even if it should not constitute the sole and only cause of the disease, causes at least nine hundred and ninety-nine cases of one thousand—is thoroughly destroyed wherever it may exist or wherever it may be found Consequently every animal affected with glanders should be killed as soon as the nature of the disease becomes known, and be buried sufficiently deep or be cremated. But as the contagion adheres frequently also to the stables—manger, floor, partition, etc.—that have been occupied, the stable utensils—brush, curry-comb, etc., and the harness, blankets, halters, bridles, saddles, etc.—that have been used or been in contact with glandered horses, it is of great importance to know what will best and most effectually destroy the contagion. Professor Gerlach has made very interesting and valuable experiments, to relate which, however, would lead too far. I will therefore only state the results arrived at. The discharges from the nose, glanders-matter, etc., lose their infectiousness if perfectly dried by being exposed to currents of air or to the rays of sun; but kept moist, for instance in a damp cellar, wrapped up in a moist rag, or adhering to the corners of the manger, to a damp wall or floor, or to the bedding or the manure, etc., the contagion seems to possess great vitality, and may remain effective for half a year or longer. Putrefaction does not destroy the contagious principle. Chlorine destroys the contagion, and is therefore a very efficient disinfectant, provided the chlorides used come in actual contact with the contagion. A brief exposure of the infectious substances, nasal discharges, glanders-matter, etc., to the influence of chlorine in a gaseous state, mixed with the atmosphere, is ineffective. As a remedy to be given internally, chlorine, in shape of chlorine-water, for obvious reasons cannot be used; chemical combinations will be effected before an absorption can take place. The best and surest destroyer of the glanders-contagion is carbolic caid. It may be used not only as a disinfectant or for the purpose of destroying the contagion clinging to the wood-work of the stables etc., but also in incipient cases of farcy, and in cases in which an infection with glanders-matter has just taken place in a wound, for instance, as a local remedy. If applied to the glanders-ulcers on the septum, or to farcy-ulcers, a tendency to heal will make its appearance. As a disinfectant, a solution of carbolic acid in glycerine or alcohol and water (1:1 or 2:20) is perfectly strong enough to be effective. Old straw, hay, and bedding must be burned, and blankets, etc., are best disinfected by exposing the same for some time to a temperature of 212° F , or higher, either in an oven or in boiling hot water.

Glanders, as well as pleuro-pneumonia, Russian cattle-plague, and scab and manger, will cease to exist if a propagation by means of infection is made impossible. If, for instance, within the limits of the United States all animals affected with glanders were destroyed at once, and at the same time every place where glanders-contagion may be existing were thoroughly disinfected, and if any importation of glandered horses or of the contagion were successfully prohibited or prevented, glanders would at once become extinct, and would never make its appearance again within the limits of the United States, unless imported again from other countries. It is a disease that can be eradicated.

The necessity for a stringent law, making the keeping and sale of a glandered horse or any other animal affected with a contagious dis-

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ease, and also the rapidity with which glanders will spread is shown by an instance cited by Dr. Detmers:

Mr. George T——, Pottawatomie county, Kansas, bought a horse of a Mr. Ch——, Manhattan, Riley county, Kansas, and pastured and stabled the same with his other horses, about twenty-four or twenty-five in number. The horse in question, when bought, had some discharge from the nose, which, of course, was pronounced to be nothing but the product of catarrh—in common parlance, a cold. In the course of the winter several of Mr. T——'s horses commenced to have discharges from the nose. Mr. T—— became alarmed, and brought the new horse, whose nasal discharges had increased, and who showed other symptoms of disease, such as a staring coat, emaciation, etc., to me for examination. I found the symptoms to be those of an advanced stage of glanders. Subsequent inquiries revealed some of the previous history of the animal. Mr. Ch—— had bought the horse from another man, whose name I do not remember, only a few days before he sold the same to Mr. T——, and had kept the animal, while in his possession, strictly separated from his other horses, because he knew the same had a chronic discharge from the nose, and had had it for about two years. Is not such a transaction criminal? And still, in the case mentioned, there is no redress to be had. Mr. T—— is a comparatively poor man; his farm is mortgaged, and all the property he may call his own consists in his stock, but especially in his horses.

It is possible that he has lost, or will lose, nearly every animal he has. Mr. Ch—— does not own anything; all his property is in his wife's name; consequently Mr. T——, if he sues for damages, will have to pay lawyers' fees and costs, but cannot recover anything. If there were a United States law which made it a criminal offense to sell animals affected with contagious diseases, or to own and to keep animals which exhibit symptoms of contagious diseases, and to neglect to advise the proper authorities of the fact, such cases as the one related would not occur. If Mr. T—— was not an honest man, he would undoubtedly have kept still, and would have sold his glandered horses to other innocent parties, and contributed in that way in spreading the disease.

In Jasper county in this State a similar case was reported to the State Board of Health.

W. H. Penquite, who rented a farm near Greencastle, was the owner of several horses. They were attacked with a disease which had all the symptoms of glanders. They all died but one. It was traced to a horse, owned by an irresponsible man, which had for several years been affected by what he claimed was only nasal catarrh, though it was well known that horses which had come in contact with this animal were taken sick and died. On the 8th of April Mr. Penquite wrote this office, to-wit:

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GREENCASTLE, IOWA, April 14, 1881.

L. F. Andrews, Secretary State Board of Health:

DEAR SIR—I have one horse that I think has the pulmonal glanders. There are no veterinary surgeons in this part of the country, and as I have lost all my horses but one, and being a poor man, and a renter, I am not able to send off for a surgeon to examine. I wish we could get a first-class surgeon to make an examination for the benefit of the public, and I think the State Board could send one to make the examination. We have some quacks here that a man can hire to say that his horse is all right. Such is the case in regard to the horse that gave mine the disease.

W. H. PENQUITE.

The foregoing was referred to Governor Gear, who requested Dr. C. N. Wright, a veterinary surgeon of Des Moines, to go and investigate the case, which he did, and found the disease to be glanders. He condemned the horse, and ordered it killed, but it died a few hours after.

GLANDERS IN MAN.

Aside from the property consideration of glanders in horses, is the horrible fact of its communication to man. Medical records abound in instances of the disease in man.

Dr. Samuel P. Duffield, Professor of Medical Jurisprudence in Detroit (Mich.) Medical College, reports in full in the Detroit *Lancet,* December, 1879, a case of a young man who came under his care, in April of that year, and who died on the 15th day. He had been driving to the plow a glandered horse, handling the animal more or less, and taken the infection through an abrasion of the skin between the thumb and first finger, caused by holding the plow. Dr. Duffield concludes the report by saying:

> I know of no more horrible death to a human being. The face, under the ravages of the disease, becomes sadly changed. The forehead and nose are red and swollen; both eyes are closed with tumefaction and ulceration, eschars (scabs) surrounded by a livid œdematous border—all contributing to the awful mutilation of the features; coupled with this comes the terrible odor of the breath, and the involuntary discharge, to complete the picture of this incurable disease.

Dr. A. Post, of Birmingham, Oakland county, Michigan, reports the case of Squire Trumbull, and which will be found in the annual report of the Michigan State Board of Health for 1879, page 306.

He was seventy-three years of age, weighed two hundred pounds, strong, vigorous, and of sanguine temperament. He owned a glandered

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horse, which he handled, and had been treating the animal by syringing out his nose. He had "knocked the skin off" his hand, and thus became inoculated. He died on the 14th day, a most pitiable looking object, and was buried immediately without being dressed or laid out, being lifted into the coffin upon the sheets and bedding upon which he lay.

The State Board of Health of Connecticut in their Annual Report for 1879, give the details of a fatal case of glanders in man at Waterbury in that year.

C. R. Merrill, a blacksmith, now residing in Des Moines, related to me a case which occurred in Warren county a few years ago. A young man, strong, athletic, and in perfect health, brought to his shop at Indianola, a pair of horses to have shoes put on them. They were fat and sleek as good feeding and fine grooming could make them. Mr. Merrill noticed that they were discharging from the nose, and called the attention of the young man, John Fisher, to the fact, expressing at the same time, his fear that the horses had the glanders, and hesitated about handling them. Mr. Fisher replied with considerable emphasis that the horses were all right, that they had taken cold, and the same instant stepped up to one horse and wiped away the discharge from the nostril with his thumb, on which there was an abrasion of the skin. He was immediately taken ill, and died a most horrible death in twelve days from glanders. The horses were then shot. Both physicians who attended him have since deceased, so that a history of the case cannot be procured.

Glanders in man is, with rare exceptions, fatal.

Prof. Bollinger says:

> We are able to pronounce the prognosis in acute glanders (in man) as unconditionally unfavorable, the result being almost invariably fatal.

HOW GLANDERS MAY BE COMMUNICATED TO MAN.

In view of the nature of the disease, and that the danger of infection may be avoided, it is important to know the sources of danger. Cases are cited where infection was had through a wound made by a whip, which had been used on a glandered horse; by a bruise received on a finger from hitting a door-post of a stall where a glandered horse was kept; by drinking from a pail from which a glandered horse had drank; by using a handkerchief with which the face of a glandered horse had been wiped; by slight scratches on the skin; by hang-nails,

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etc. The virus may enter the system through the nose, eyes, or mouth. by particles of pus snorted from the nose of a glandered horse, hence the great danger incurred from riding behind such an animal. The disease has also been contracted by sleeping on straw in a stall where a glandered horse had been kept; also, by using a blanket which had covered a glandered horse; also, from handling hides taken from glandered horses, hence the great importance of placing the carcass of such animals beyond the possibility of infection. In France the skin of a glandered horse at death is slashed so as to render it worthless for manufacturing purposes. It should be buried deep, beyond the possibility of resurrection; for the disease is communicable to other animals, than which none are more liable to infection from carcasses of glandered animals than dogs, which fact increases the danger, owing to their association with man and domestic animals.

Ziemssen's *Cyclopœdia* says:

Glanders occurs in asses and mules, as well as in horses. Sheep are especially susceptible to glanders. Goats, dogs, cats, prairie dogs, polar bears, lions, rabbits, guinea pigs, mice and swine have been known to be infected with the disease. The only domestic animal that seems to be exempt is the ox.

Dr. Detmers, in his report, page 285, says:

The glanders-contagion, whatever its nature may be, communicates glanders and farcy not only to the animals belonging to the genus equus, but also to other animals and to man. Numerous cases are reported every year in the periodical veterinary literature. The only domestic animal that seems to be exempted, or to be destitute of any predisposition, is the ox.

NECESSITY AND MEANS OF PREVENTION.

It is evident the only means of preventing glanders in man, is the extirpation of glandered animals. It is exceedingly important that the disease should be grappled at the first appearance, and the suspected animals securely guarded against all possible infection, and that when the nature of the disease is determined, the animals be immediately killed and buried.

Dr. Detmers says:

Glanders, as well as pleuro-pneumonia, Russian cattle plague, and scab and mange, will cease to exist if a propagation by means of infection is made impossible. If, for instance, within the limits of the United States all animals affected with glanders were destroyed at once, and at the same time every place where glanders-contagion may be existing were thoroughly disinfected, and if any impor-

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tation of glandered horses or of the contagion were successfully prohibited or prevented, glanders would at once become extinct, and would never make its appearance again within the limits of the United States, unless imported again from other countries. It is a disease that can be eradicated.

It is quite clear some measures should be adopted for the control and management of horses suspected of glanders. To this end the following general rules are formulated and recommended by the Michigan State Board of Health:

1. Whenever there is reason to suspect that a horse or other animal has the glanders, or has been exposed to the disease, he should be entirely separated from all other animals susceptible to the disease, until from an examination, or from repeated examinations by a competent veterinary surgeon, it can be positively determined whether or not the animal has the disease, or, in case of a possible exposure, whether he has, without contracting the disease, passed the maximum period of incubation.

2. Notice of a case, or of a suspected case of glanders, should at once be given to the health physician, or board of health of the city, town or township in which the animal may be owned or kept, and all persons who might have anything to do with the suspected animal should be warned of the danger which they incur. As few persons as possible should go near such animal, and they should be instructed and enjoined to take all possible precautions against contracting the disease, or conveying it to others; they should avoid his breath; keep to the windward side; avoid receiving on an abraided skin any discharges, etc.

3. No glandered animal, or one suspected of glanders, should be taken into any field, common, road, building, or other place frequented, or liable to be frequented by horses or other animals susceptible to the disease.

4. When an animal is known to have the disease, he should be killed immediately, and the carcass buried deep in the earth, with the hide on, the hide having previously been slashed.

3. The feed-boxes, mangers, racks, where he has been fed, or anything which he may have bitten or rubbed against; any post or fence against which he may have rubbed; the harness, halter, wagon-pole, neck-yoke, combs, brushes, and all else which has been used on or about him, should be burned and destroyed, as the only safe and effectual mode of preventing contagion.

6. The stable in which a glandered animal has been kept should be destroyed, or, if practicable, thoroughly disinfected by burning therein not less than two and one-half hounds of brimstone to every thousand cubic feet of air space therein. To properly disinfect a stable it must be closed tight.

7. As some persons and animals are more susceptible to glanders than others, the greatest precaution should be observed to keep all from exposure, for in no case of exposure is there certainty of escape from the disease.

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NECESSITY FOR LEGISLATION.

The statutes of Iowa are inadequate to secure the necessary protection against this disease which its nature demands. Section 4057 of the Code of 1873 provides that if any person finds a glandered horse, mule or ass reasonably supposed to be diseased with glanders running at large on his premises without any known owner, it shall be lawful for him to take such animal before a justice of the peace, for examination by a competent veterinary surgeon. That is to say, he must chase the animal over his farm, exposing other animals to infection, catch him and lead him miles away to a magistrate, exposing his own life, while the diseased animal scatters infection broadcast on the way. Ample authority should be given local boards of health to restrain all suspected animals until the disease could be determined. They should also have power to cause immediate investigation on notice, of any suspected case of glandered horse, and to order any animal diseased with glanders to be killed and buried.

Under the powers given in section 2, chapter 151, laws of the Eighteenth General Assembly, the State Board of Health has adopted the following rules for the use of local boards of health: [see page 22]

No animal affected with an infectious or contagious disease shall be bought, sold, or kept within the jurisdiction of this board. And any animal affected with glanders shall, after notice from this board, be immediately killed, and buried deep, without removing the hide from the carcass.

The owner or any person having the care of any animal within the limits of this [city, town or township] knowing or having reason to believe said animal to have the disease called glanders, or farcy, shall not lead, drive or permit such animal to go in or over any public grounds, uninclosed lands, street, road, public highway, lane, or alley in this [city, town or township], or water such animal or permit it to drink at any public water-trough, pail or spring; or suffer such diseased animal to be kept in any enclosure in or from which may come in contact with or close proximity to any other animal not affected with such disease; and such persons aforesaid shall, within twenty-four hours, give notice to the health officer or the board of health of this [city, town or township] of the location of the diseased animal. And any veterinary surgeon, or any person who acts as such, who shall have knowledge of any animal diseased with glanders or farcy within the jurisdiction of this Board shall within twenty-four hours give notice of the same to the health officer or board of health of this [city, town or township].

While the powers of the State Board of Health may be construed as ample to secure protection, it is better to have the question settled and fixed by direct statute, with penalties affixed sufficient to insure

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compliance therewith, and commensurate with the horrible nature of the disease.

GLANDERS IN IOWA.

As has been stated, the frequency of cases of glanders reported to me evidences its prevalence widely over the State. Cases have been reported from the counties of Adams, Cass, Crawford, Dallas, Fayette, Grundy, Guthrie, Jasper, Marion, Madison, Polk, Poweshiek, Union, Warren and Webster.

Having no authority in the premises the matter was referred to Governor Gear, who selected Dr. C. N. Wright, of Des Moines, Professor M. Stalker, of the State Agricultural College, and Drs. James Dolson & Son, of Atlantic, competent veterinary surgeons, to make examination of suspected horses in their vicinity. Professor Stalker reports finding in Lincoln township, Grundy county, five cases of chronic glanders and other cases in which the symptoms were, but not sufficiently developed to positively determine the disease.

Dr. Wright reports one horse found on the commons in Des Moines; one mare in Delaware township, Polk county, in the last stages of pulmonal glanders; also, one colt, diseased with nasal and external glanders; in Poweshiek township, three cases of nasal and external glanders; in Washington township, Monroe county, two cases of nasal and external glanders; in Boonville, Dallas county, two cases of nasal and external glanders; in Madison township, Madison county, two cases—one nasal, the other nasal and external glanders; in Stuart, Guthrie county, two cases—one nasal, the other nasal and external glanders, in all of which the animals were condemned.

Drs. Dolson report as follows:

ATLANTIC, IOWA, August 13, 1881.

Secretary of the State Board of Health:

DEAR SIR—I herewith give a statement of the animals I have examined and condemned as having glanders: One horse, two and one-half miles from Atlantic; killed. The owner's name I have forgotten.

On the premises of Mr. Huntoon, four miles southwest of Atlantic, three mules, all killed at once.

I was called by the board of health of Union township, Adams county, to investigate suspected cases of glanders, and found one horse owned by Thomas Edwards; two by August Rettz; one by M. Looney; one by M. Talley, all of which I condemned. While at Cromwell, in Adams county, a case was reported to us where a man who resided just across the State line in Missouri traded for a horse which the seller said had epizoo. In nine days after the purchaser died from acute glanders.

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On the farm of John P. Irish, eleven miles southwest of Atlantic, I found two horses diseased with glanders.

There is no doubt glanders exists to a fearful extent in nearly every county and township in Iowa, and unless prompt and effective measures are taken to eradicate it the result will be horrible. The law now seems to be very defective to secure this result. It should be made a criminal offense, with severe penalty, for any person to keep in his possession or on his premises a glandered animal, and in case of suspected glanders the owner of the animal should be compelled to isolate and confine such animal entirely apart from all possible contact with other animals, until the disease is fully determined. Only severe measures will accomplish the desired end, as it is the natural inclination of persons owning such an animal to secrete the disease.

Respectfully,

JAMES DOLSON & SON, *Veterinary Surgeons.*

A large number of cases have been reported to Governor Gear, and requesting him to send a competent veterinary surgeon to investigate the disease and determine whether or not it be glanders, it being proverbially the case that owners of suspected glandered animals deny that the disease is glanders, from pecuniary motives, and the result is, under the present statutes, the animal goes at large, scattering the disease wherever he goes. The necessary legislation should be had to authorize local boards of health, or health officers thereof to isolate all animals suspected of glanders, and also compel the owners of such animals to keep them separate and apart from all possible infection or contact with other animals, and prohibit them from going upon public highways, or the premises of another, until the nature of the disease is definitely determined by competent authority.

The cases reported to the Governor were: Cedar Rapids, 3, September 1; Anita, Cass county, several, July 22; Webster county, 20, July 8; Polk City, Polk county 1, July 16; Melrose, Grundy county, 4, July 8; Calhoun county, 8, July 8; Warren county, 2 mules, July 10; Rippey, Greene county, several horses and mules, July 27; Dexter, Dallas county, 1, September 20; Adair county 2; Madison county, 40, August 5. The latter is doubtless an exaggeration.

In all cases reported relief is asked under the health law, but it is only by presumption, or implication that this law affords any remedy. The State Board of Health have exercised in that direction all the power given the Board, under the statute, which is only directory. It should be made mandatory by legal enactment.

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ADULTERATION OF FOOD.

BY

R. J. FARQUHARSON, M. D.,

BY SPECIAL REQUEST OF THE

STATE BOARD OF HEALTH.

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FOUR HUNDRED AND FIFTEEN EAST 14TH ST.,
Davenport, Iowa, April 30, 1881.

DR. W. S. ROBERTSON, *President Iowa State Board of Health, Des Moines, Iowa.*

DEAR SIR—Herewith, I have the honor to transmit my report on the "adulteration of food." Hoping that it may prove acceptable to the Board, I am, very respectably your obedient servant,

R. J. FARQUHARSON.

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ADULTERATION OF FOOD.

The subject assigned to me by the State Board of Health is of too great importance and of too vast an extent to be properly treated in a paper, the length of which is necessarily limited by a total want of original facts, the results of investigations requiring both time and money for successful prosecution.

In this country, up to within a few years past, there have been few, if any thorough and reliable examinations into the purity of the most important of foods, the staple ones.

The truth of this statement is made quite apparent from the following fact:

The National Board of Trade, last year, offered prizes for essays on the adulteration of food in this country. "The object (among others) to be kept in view in preparing the essay shall be to show (first) what are the usual deleterious adulterations of articles of food or drink in this country."

Now, of three essays deemed worthy of a prize, and published in a supplement to the Sanitary Engineer (January, 1881,) neither contains any account of any research into the condition of food in this country, but all quote Hassall (London, 1854, 1st. ed. 1876), that apparently inexhaustable mine for subsequent writers in all countries.

The author of the essay getting the second prize (Vernon M. Davis of New York City), in the fifth paragraph of his valuable paper, says: "*Dr. Hassal's examination of the subject has shown that adulteration was universally practiced in England.*" "*It is not unlikely that most of the same adulterations will be found in the food and drink of the United States.*" "*In the third place, annalyses, so far as they have been made in this country, prove the existence of the practice, and reveal adulterations identical with those discovered in other countries.*"

Now, according to Hassall, there has been a great change for the better in England, for, in 1860, he, as chief of the Lancet Commission reported sixty-five per cent of the total samples examined as adulterated; while in 1879, of 17,500 samples examined, 17.2 per cent were found adulterated; of bread in 1860, almost all samples contained alum, while in 1879, of 4,471 samples of bread examined, only 4.62 per cent were found to contain any adulterations.

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That the inference of the existence of any such general adulteration of food in this country, comparable to what formerly existed in England was not sustained by a perusal of these papers, nor by any investigations that have been made thus far is shown by the following remarks by the eminent men composing the committee of award.

"*It is very gratifying to find that none of the essayists produce any definite or satisfactory evidence as to the wide-spread existence of such dangerous adulterations in this country.*" "*The absence of such evidence, in addition to the results recently attained by several expert chemists in extensive series of analyses of the usual articles of food in this country, which results have been made known to the committee, fully warrants us in declaring that none of our staple articles of food or drink are so adulterated as to be dangerous to health or life. Such dangerous adulterations appear to be mainly in the form of poisonous colors or coloring matters, as for instance, in confectionery, and even these are rare.*"

The investigations alluded to by the committee of award are those of Dr. Kedzie, President of the Michigan Board of Health, and of Dr Smart, U. S. A., published in recent supplements of the Bulletin of the National Board of Health; and of Mrs. Ellen H. Nickols, in an article on "*The adulteration of some staple groceries*," published in the First Annual Report of the State Board of Health, Lunacy and Charity of Massachusetts (1879).

These several papers have been freely used in the preparation of this article; where other authors are used, an acknowledgement will be found in a foot-note or otherwise.

The author of this paper will feel most abundantly repaid for any time and labor bestowed upon its production, if the perusal of it by the people of Iowa should have little other effect than to quiet their minds of apprehension and disabuse them of the effect of certain sensational articles going the rounds of the daily press, apparently neither by persons of a pessimist cast of mind, who would exclaim with Falstaff, when he found lime in his sack, "There is nothing but roguery in villainous man."

The fact being, as shown by the most recent and most carefully conducted researches, that all of the staple articles of food which are commonly found on our tables in America, when of fair quality, *i. e.*, when bought at a fair price, are nearly or quite pure; and if not absolutely free from foreign ingredients, the apparent sophistication is accidental or incidental, and not intentional.

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We shall now review, in as concise a manner as is consistent with requisite clearness, most of the articles of food used in this country; dwelling longer upon and treating more in the detail of those either produced largely, or commonly consumed in the State of Iowa.

FLOUR.

This "staff of life" appears in England to be liable to adulteration by the following articles: The meals of barley, beans, potatoes, maize, oats, rye and rice; with carbonate of lime or magnesia; sulphate of lime and bone dust. But in this country where it is abundant and cheap, such is not the case; the most samples, if not quite pure, at least are seldom or never intentionally adulterated.

In Massachusetts, twenty-five (25) samples of flour, from eleven (11 towns, were examined, and in no case was there any evidence of mineral addition.

In Washington, of fifty-eight (58) specimens of flour collected from military posts and depots in different parts of the country, examined, only one contained matter foreign to the wheat kernel, and in this case the adventitious substance was corn meal, evidently introduced by accident.

Dr. Smart explains why there is no temptation here as in England to mix bean flour, by the fact that as twelve per cent of gluten is necessary for good bread, and we have flour up to 17.5 of gluten, these so-called strong flours may be mixed with the weaker ones, thus bringing the nitrogenous matters up to the standard without the use of beans.

BREAD.

Unfortunately, in our country the same purity cannot be predicated of the bread, *i. e.*, of the so-called baker's bread as distinguished from the home-made, or domestic bread.

Of eighteen (18) samples of bread in Washington, D. C., eight (8) contained alum.

Dr. Waller, in the fourth annual report of the Health Department of New York City, reports upon the bread sold in that city: of fifty-one (51) samples, forty-one (41) contained no adulterant; two (2) contained copper, probably added as the sulphate; six (6) contained an excess of alumnia; and two (2) both alum and copper.

It may not be out of place here to state that the whole question of the injurious action of alum in bread appears to be still undecided.

English bakers have certainly used it since the time of Henry VIII,

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for there is a household ordinance of that doughty monarch threatening his court baker with the stocks for using it; they still use it, notwithstanding the adulteration act, as the report of English analysis shows. Now it has never been clearly proven in all this time that the small quantity used had a directly injurious effect upon the human stomach; the alum is said to be converted into something insoluble and inert during the process of punification; it certainly has been shown by Professor Patrick, of Kansas University, to be unaffected by the juices of the stomach.

CORN MEAL.

In Washington, D. C., of the samples examined all were found of excellent quality, and free from any extraneous matters.

OATMEAL.

No account of any examination of this excellent food product, now largely manufactured in our State, is at present accessible, but no doubt the result would be equally favorable.

SUGAR.

The varieties of sugar commonly used in this country are in the order of purity, loaf, granulated, and powdered, white; light, and dark brown, colored.

Sand, which was the oldest of adulterants mentioned by writers, has disappeared, except as an accident. Another indication of impurity which could twenty-five years ago be found in almost every sample of brown sugar, even in those of good quality, *i. e.*, the acarus, seems to have almost entirely disappeared, probably from some change in the process of manufacturing the brown sugars.

Chloride of tin and chloride of lime are also mentioned as adulterations of sugar, the former being used by the refiners to improve the color of the sirup and the resulting sugar, the latter derived, either from the water, or the lime used in boiling the cane juice.

But there is a more common adulterant in use, which, as it is largely made in this State, deserves more consideration than the others. Glucose, or grape-sugar, is made by boiling corn starch with dilute sulphuric acid, and afterward precipitating the acid by means of lime. The samples examined by me had the appearance of tallow, being in a solid mass, with a waxy and with a somewhat conchoidal fracture, it is not more than half as sweet as pure cane sugar, owing to its less rapid

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solubility in the fluids of the mouth and fauces. It has a decidedly bitter aftertaste, more perceptible to children than to adults, the sensibility of whose palates has been blunted by the use of condiments. Whether this bitter aftertaste is a property of pure glucose, or, as is more probable, is the result of the retention of some product incidental to the manufacture, is not stated in any account at present accessible to me. If the lime used contained magnesia, the resultant sulphate of magnesia (epsom salts) would not be precipitated, and clinging to the glucose, after the boiling down would taste bitter. The bitter taste may also be the result of the formation of salts of lime with glucose (sucrates or sacchyrates or oxysacchyrates), all of which are said to have a more or less bitter taste. Glucose, when dissolved in water by boiling, made a sirup of a rich maderia wine color, which was used in my family, though the children objected to the bitter aftertaste.

The manufacture of glucose has been but recently commenced in this country, and the product at first was almost entirely exported. It is not yet very extensively made (owing to the supply of technical or expert labor being far below the demand), but is used in the manufacture of the soft kinds of confectionery, the preservation of fruits, the formation of sirups, and, also, for the adulteration of sirups and sugars.

Now, though this is a fraudulent, it is not in any sense a harmful or deleterious, addition, for there is no doubt that glucose is a wholesome and nutritious article of food; indeed, all the cane sugar we eat is changed to grape sugar, or glucose, in the process of digestion. As there must be some loss of force in this process of conversion, it stands to reason, physiologically speaking, that glucose is a better food than cane sugar.

Having used it freely in my own family, I am satisfied as to its wholesomeness as a food. However, it should be sold under its own name, and could be afforded at five (5) cents a pound, and should not be mixed with cane sugar, and sold at ten (10) cents.

Glucose exists in a considerable quantity in honey, sorghum, sirup, and molasses, and none of these commonly eaten articles have been found injurious.

Quite a panic was produced within a few years by sensational articles in the papers on the subject of glucose, and in one State at least (Connecticut) a law was passed forbidding its sale. The law, however, has never been enforced, and in the Third Annual Report of the State Board of Health of Connecticut, occurs the following language: *"The law passed at the last session concerning the sale of glucose is entirely*

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*uncalled for. Fortunately no attempt has ever been made to enforce it. * * * It should, however, be at once repealed, as it might be used maliciously."* Various modes of detecting glucose have been devised: When mixed with cane sugar, if the latter be dissolved out by a saturated solution of starch sugar in methylic alcohol, under a microscope the rounded dull looking grains of glucose may be readily distinguished from the bright, clearly defined crystals of cane sugar. Another mode, founded on the comparative slowness of the dissolution of glucose in cold water, is to place the suspected mixture in a beaker or watch glass and add thereto a small quantity of cold water; the cane sugar, or at least a portion of it, quickly dissolves, and the refrangibility of the remaining crystals being nearly the same as the resulting sirup, hides these, and permits the particles of slowly dissolving glucose to be plainly seen as specks. Still another mode of detecting glucose is to let dissolve in the mouth a pinch of pure powdered cane sugar before tasting the suspected sample; if glucose is present, a decidedly bitter taste is developed; chloride of tin may also be detected in this way.

But for the detection of glucose in honey, sorghum, molasses, and some other sirups, as also in the brown or muscovado sugars, which all contain a certain proportion of glucose, none of the above processes are applicable. Here the best mode is after finding out the proportion of glucose by chemical analysis in a normal specimen of any of the above, to compare it with the quantity found by analysis in the suspected sample; any considerable excess in the percentage of glucose being rated as adulteration.

Some sugars contain sufficient iron to blacken tea in which they are dissolved; this, though unpleasant to the sight, does not render such tea deleterious, as the iron (which comes from the vessels used in making the sugar) is in very small quantity.

RECENT EXAMINATIONS OF SUGAR.

In 1879 the public analysts of England examined two hundred and thirty-four sugars, and found but one of the specimens adulterated.

In 1873 one hundred and nine samples of powdered sugar were reported by the health authorities of New York City as free from glucose, and the purity of the sirups and brown sugars sold in that city was established.

In a paper read before the American Chemical Society on March 4, 1880, Mr. Casaniajor, a chemist constantly engaged in the examination

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of sugars, stated that he had that week for the first time had the good fortune to come in possession of a sample of refined sugar largely adulterated with glucose; and that it came from St. Louis, and was marked "powdered sugar."

In 1879 Mrs. Richards examined seventy-five sugars from seventeen towns, with the following results: Not one of the sugars gave reactions for tin. Of the white sugars not one gave reactions for chloride of calcium; one only out of the fifty-five gave any indication of glucose, and that in a faint degree. Of the thirteen brown sugars, one gave reactions for chloride of calcium. The worst two of these were analyzed, and gave respectively three-tenths and four-tenths of one per cent of chloride of calcium and chloride of sodium or salt, a quantity that might have been derived from the water used in the process of manufacture, and too little to do the least harm. Of the thirteen brown sugars, six gave traces of reducible sugar or glucose, and three only gave considerable amounts, 8.3, 8.6, and 11.1 per cent respectively. Two of the three samples were of the darkest color found, and undoubtedly contained some molasses, which always carries a large per cent of reducible sugar or glucose, formed in the process of the refining of the cane juice. As honey is almost entirely composed of glucose, it is difficult to see wherein the *"dangerous qualities"* of the molasses glucose lie.

In 1879 Dr. Kedzie says: "I have analyzed a large number of 'granulated,' 'crushed,' and 'powdered' sugars without finding glucose in a single instance.

"In sugars not so distinctly crystalline, such as the various grades of coffee sugar, brown sugar, etc., adulteration by glucose is more feasible.

"In one specimen of coffee C I found 5.75 per cent of glucose; in another 2 per cent; in two others 1⅞ per cent; in extra C 1¼ per cent; and in A 1 per cent. This does not show any heavy adulteration." (*Dr. Kedzie, Report Bulletin of National Board of Health, Supplement No. 6, page 32.*)

In 1880 Dr. Smart, U. S. A., gives the following as the result of the examination of sugar in Washington, D. C.: The white sugars, powdered, granulated, etc., were free from glucose; twenty-four were furnished by dealers, and fifteen were purchased. No tin or other unwholesome substances, sometimes stated to be used by refiners, were found in the specimens. But when we came to the brown sugars a

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very different result was found from those at Boston and New York. Among forty-seven brown sugars, most of which were furnished by dealers who knew that their samples would be examined, there were found three which contained glucose, while among thirty-eight samples purchased for analysis no less than nine were thus adulterated. The glucose varied from a small admixture to thirty per cent. Dr. Smart regards six per cent as the highest even for dark specimens of sugar. In all the specimens of high percentage of glucose microscopic masses of boiled starch are found in the sediment of the sugar solution. This affords another mode of the detection of adulteration by glucose.

SIRUPS.

In 1874, Dr. Kedzie, of the Michigan Board of Health, examined seventeen sirups all purchased of first class grocers and found only two to be pure; the others were glucose and contained large quantities of sulphate of iron and lime; the lowest contained twenty-five grains of the iron salt, and one hundred of lime to the gallon, and the highest fifty-eight grains of the iron salt and 724 of lime. On the other hand, in 1880, Dr. Smart, at Washington, D. C., examined twenty-one samples of sirups from first class grocers, and twelve from the lowest grade stores which could be found in Washington City, and found these specimens without excess of lime or iron, and with such a small percentage of grape sugar, the highest being thirty-five per cent of the total sugar, as to preclude the possibility of an addition of glucose; the entire absence of the indication afforded by masses of starch under the microscope greatly strengthen this position.

According to Hassall golden sirup, molasses and treacle contain, respectively, of grape sugar thirty-three, eighteen, and thirty-seven per cent of the total sugar. Of the great discrepancy in the results of analysis between himself and Dr. Kedzie, Dr. Smart remarks *"that it is difficult to reconcile them except in the assumption that at that time the market was stocked with a manufactured article which failed to please the public taste, and has since disappeared."*

Dr. Kedzie, in 1879, again examined twenty-one specimens of table sirups, and only found one in which the sugar was entirely cane sugar; in the majority of the others the percentage of glucose in the total sugar would average at least seventy-five per cent, called respectively; 1, Crystal drips; 2, Honey drips and Silver drips. There was no cane sugar whatever.

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VINEGAR.

According to English law vinegar must contain at least 3.5 per cent of acetic acid (from alcohol), and not more than one-tenth of one per cent of free sulphuric acid. In this country the prevailing defect with vinegar, as in the parallel case of milk, is too much water.

Dr. Smart's examination of fifteen samples in Washington, D. C., showed the only adulteration to be dilution by water; three specimens had less than three per cent of acetic acid. Traces of iron were found, but no copper, lead, or other dangerous metals were found, nor any free mineral acids. Two specimens were alive with anguillula (vinegar eels), and these were fair samples of good vinegar.

Dr. Paton, the analyst to the Commissioner of Health in Chicago, during the past year examined twenty-four samples of vinegar, and found four worthy of condemnation; one for containing copper, and three for dilution containing only one and one-half, one and three-fourths, and two and one-half per cent of acetic acid; the latter also contained free muriatic acid.

PICKLES.

These generally have the same adulterations as are found in vinegar, from which they derive whatever they may have.

Highly colored pickles should be avoided, as these, both in England and in this country, have been found to contain copper in a noxious quantity.

COFFEE.

In this State, to prepare this popular and fragrant beverage, the coffee is either bought in the green state, then roasted and ground at home, or bought in a roasted state from the grocers and ground as it is to be delivered, neither of these modes of preparation leaves any room for adulteration. But those who use ground coffee put in packages, and still more probably the few that use the so-called "coffee essences," are very apt to get a very sophisticated article, much chicory, leaves, rye, etc., and very little coffee.

Although a mixture of chicory, and coffee, if so labeled is permitted by English law, yet the former continues to be used as an adulterant, for in 1879, out of 1,244 samples of coffee examined by the analyst 236 or 18.9 per cent contained chicory. Dr. H. B. Hill (fourth annual report of Massachusetts Board of Health) examined ten samples of ground coffee, bought in bulk, and found them all pure; while of

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seven samples of package coffee, one contained no coffee at all; two very little; and four from fifty to seventy per cent of coffee, the rest being roasted wheat, peas, beans, and chicory.

In Dr. Smart's examination of ground coffee in bulk or loose coffee, of twenty-five samples three were found to contain either chicory alone or chicory and beans; one package of coffee was examined and found to contain no coffee whatever. The same might also be said of three samples of extracts or essences of coffee, one of which consisted of chicory, and the two others of roasted starches.

The adulteration of ground coffee is most readily detected by the microscope in the hands of an observer already familiar with the appearance of pure ground coffee; the readiest practical test is to make an infusion of known strength and compare it with an infusion of pure ground coffee of the same strength; afterward a comparison of the dregs of the two infusion, would confirm the conclusion, or remove any doubt in the mind of the observer, after tasting the two infusions.

TEA.

From a recent "trade circular" we learn that the principal grades of tea now known to American consumers are as follows:

Black Teas—Oolong: Formosa, Amoy, Foochow, and Ningyong; English Breakfast: Congon, Souchong, Tarry Souchong, and Assam.

Green Teas—Japan: colored and uncolored or "basket fired." Other green: Gunpowder, Young Hyson, Old Hyson, and Imperial.

Mixed Teas—Oolong and Japan: Oolong and Gunpowder or Hyson or Imperial.

The annual consumption in the United States at present (1880) is as follows: Japan (green), 35,000,000 pounds; other green teas, 20,000,000 pounds; black tea of all kinds, 15,000,000 pounds; total, 70,000,000 pounds.

A tea sold at a lower price than thirty cents per pound is apt to be spurious or adulterated with other leaves. The greater part of the pure tea is sold at an average of fifty to sixty cents per pound.

Hassall gives the following terrible list of adulterations of tea divided in three categories, those added to increase the weight; to improve the color; or to somehow modify the taste or smell; exhausted tea leaves other than those of tea as sycamore, horse-chesnut, plum, tie-tea, paddy-husk, sand, quartz, magnetic oxide of iron, starch, plumbago, gum, indigo, Prussian-blue, turmeric, Chinese yellow, China

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clay, soapstone, mica, sulphate of lime, sulphate of iron, catechu, gum, Chinese botanical powder.

From this author, and from many articles in the current literature of the day one might readily be led to believe that adulterated teas were quite common, that indeed it would be a difficult matter to find any pure specimens in the United States or in England. Such, however, is not the case, the adulterated teas being in a decided minority in both countries.

In England the tea, before being admitted for home consumption, is sampled and examined by sanitary inspectors. In 1879 the result was the following: of 575 specimens only seventeen were of such a character as to require the board's direction as to their disposal, but as fourteen were allowed to be delivered without any restriction there remained only three for special action, and only one of these (fresh water damaged) was condemned to be destroyed, while one with old and exhausted leaves was allowed to be delivered for exportation only, and one (plundered in China and the weight made up with sand) was sifted and repacked.

We have in this country (as we should) no such system of custom-house inspection, but, were it in existence, equally favorable results would probably be shown.

Dr. Smart examined 109 specimens of tea derived from various sources and of them five only were fraudulently adulterated: one Gunpowder, from an excess of lime sulphate facing; one Imperial, from an admixture with sand; and three Imperials from the presence of exhausted leaves; these were all green teas.

Of these adulterations Dr. Smart remarks: "*Whether these debasements were affected in China or in this country is an open question, but from the character of the English importations it is probable that exhausted leaves are dried and recolored in this country for sale among the poorer classes of the community.*"

In this country, where the great bulk of the tea consumed is green, the outcry has naturally been against the coloring ingredients used in China and Japan for the so-called "facing"; but the extent, the deleteriousness and the intent of the additions have all been most grossly exaggerated and misrepresented. The amount of Prussian-blue in Chinese tea, or of indigo with sulphate of lime and silicates in those of Japan, must be small indeed when, as shown by Dr. Smart's analysis, "*some of the greens which were examined contained less mineral matter than the unfaced black teas.*" Such small amounts of the

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above ingredients could not in any reasonable manner be considered as positively injurious.

This facing is found in the best qualities of tea, and though the practice may have originated in an attempt to deceive in some way, yet such is not the case now, as all green teas are bought for importation with a full knowledge on the part of the purchaser of the existence of the facing.

The proper examination of tea is a delicate and difficult task, only to be undertaken by an expert who combines the attainments of a chemist, a microscopist, and a tea-taster.

BUTTER.

In this country, until quite recently, the only foreign ingredients to be found in butter were the small quantities of water and curd, or caseine, left behind in greater or less quantity according to the comparative perfection of the process of making; and the modicum of salt added for its savor and its antiseptic quality, with annotto for coloring.

The English law limits the quantities of these ingredients, as follows: Water not to exceed fifteen per cent, the curd five per cent, and the salt eight per cent.

But now the markets seem to be plentifully stocked with quantities of imitations of butter produced by the substitution of foreign fats, as those of the beef, mutton and pork, for those indigenous to butter.

These various articles are called by many names, as oleomargarine, butterine, suine, etc., and these terms are frequently used by writers in the daily papers and others as, if not exactly synonymous terms, yet as indicative of closely allied products.

But such is not the case, and, as in every other investigation, so there nothing is perhaps of more importance than a proper definition and understanding of terms. Butterine and suine are admixtures of real butter of poor quality with lard, one hundred pounds of butterine, generally in Chicago, containing twenty-seven and one-half pounds of butter, sixty pounds of lard, and twelve and one-half pounds of salt. The lard (beef-fat) is melted at a low temperature (150° to 180° F.) and then bleached, becoming, when solid, white, and crystalline like snow.

This process seems to have originated in Cleveland, where it has been carried on for many years. It has extended also to Chicago and perhaps to other cities in the West; in the East, *i. e.*, in New York

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State (as we shall presently see), this prepared lard is used to adulterate cheese quite extensively, but whether butterine is also made in that section does not appear.

I have had in my possession a sample of butterine made in Cleveland, and sold there by wholesale at seventeen cents per pound, which was a good imitation of ordinary country butter. It deceived an old butter-making farmer, and was readily consumed by my family when placed on the table.

Oleomargarine butter is quite a different substance, a much more dangerous counterfeit, so resembling the real article in taste, smell and other qualities as, it is said, to deceive the most clever and experienced experts. Indeed, the only certain mode of distinguishing the two is a chemical analysis, which will show the deficiency in the quantity of volatile fatty acids in the oleomargarine butter, only 1.8 per cent as compared with 7.5 per cent in true butter.

Oleomargarine butter, as made according to Mott's modification of Mége's patent of 1873, is prepared as follows :

Beef suet (the caul fat), after being most minutely crnshed and divided in a machine, is melted by steam heat at a temperature of 125° F.; this, when again solid, is pressed in cotton bags at a temperture of 80° F., the stearine is left behind and what flows out is the oleomargarine oil; immense quantities of which are shipped to Europe, and much used here for the manufacture of soaps, cheese, and, by Mott's process, also butter. Mége's formula was to churn together one hundred pounds of oil, thirty-three and one-third pounds of milk (sweet), three ounces of annotto, and one and one-half ounces of bicarbonate of soda, adding thereto a small quantity of rennet.

Mott omits the last named ingredient as useless, and proceeds as follows:

He first churns one hundred pounds oil, twenty pounds sour-milk, two ounces solution of annotto, and one-half ounce bicarbonate of soda; this flows off through finely divided ice (which takes out the grain), and of this product thirty pounds are re-churned with twenty pounds sour churned milk, for fifteen minutes, then solidified by flowing over broken ice, and placed on the working table, when salt is added in the proportion of one ounce to the pound.

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CHEESE.

In cheese the English law allows no foreign ingredients but salt and annotto; but as this coloring-matter is sometimes adulterated with copper. Cheese as well as butter so tinted is liable to show a trace of contamination by that metal. Other vegetable matters, equally harmless as annotto, are used, however, in coloring cheese, as chlorophyl, which produces the duck-green of the Swiss sapsago (schabzeiger), and the beautifully mottled-green of our sage-cheese.

Formerly, our cheese, which was cheap from abundant production, was remarkable for its purity; one would think that an article so cheap would, like flour, corn-meal and lard, have escaped adulteration.

But such is not the case, from some cause or other, probably from the great and rapidly growing consumption of our cheese in Europe, it is largely adulterated, the newspapers teeming with accounts of lard cheese, oleomargarine cheese, anti-huff cheese, etc.; the offending ingredients, being as in the case of butter, lard and oleomargarine oil.

In regard to the use of the latter, Sharples in his article on adulteration of food (Buck's Hygiene, Vol. 2, p. 362), says: "The method of working is to allow the milk to stand for twelve hours, and skim off the cream which is used for making butter. An equivalent portion of oleomargarine, or of pure tasteless tallow oil is then added, and the cheese-making proceeded with in the usual way.

The detection of this fraud is extremely difficult if not impossible. Just the same process is followed in making lard-cheese, as witness the following testimony given before the committee of the lower house of the legislature of New York, by a member of that body. Assemblyman Crapser of St. Lawrence county, among other things said:

"It is necessary to add oil if a richer cheese is wanted. We have never been able to do it in this country until recently. Lard is now substituted in place of cream or butter oil. To one hundred pounds of skim-milk we add one and one-half pounds lard, and have to buy the best lard we can.

"We get it at Chicago or elsewhere and it has to be deodorized (generally by blowing hot steam through it).

"One hundred pounds of skim-milk and one and one-half pounds of lard make ten pounds of cheese, which is of good quality, we finding a ready sale for all we make.

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"This new cheese is made from sweet milk, from which the cream has been removed at 40° F., after standing twelve hours.

"No chemicals are used, except some coloring matter, which we make. I have twenty-one factories and have put them to making lard cheese as fast as possible. Seven of my factories are now making lard cheese which goes to Chicago, Boston, New York and Baltimore."

The anti-huff cheese is made by a new method and is described as follows: The skim-milk of three or four days collecting, is heated to 86° and the anti-huff extract added in the ratio of one ounce to one hundred pounds of milk. This extract is composed of an alkali that changes the milk from sour to sweet. About ten minutes after the anti-huff has been added, rennet is applied and the process proceeds much as usual.

The preculiarity of the anti-huff method is its direct contrast to the old practice which works sweet milk up to an acid, standard: by it sour milk is reduced to a sweet curd. Cheese makers who favor the new process explain that anti-huff is an antiseptic which gives to cheese preservative qualities. The extract furthermore imparts a rich color to the cheese. As may be inferred, this invention is looked upon by many as a most valuable one. Others there are who do not favor it at all; but while admitting that anti-huffing produces from skim-milk cheese resembling in appearance full cream cheese, insist that its effects on the human stomach are deleterious. Whether this new departure in cheese-making is to become a permanent one time alone must decide.

SPICES.

Of these, especially in the ground or powdered form, as usually sold in this country, but little need be said, and that is that they are largely and generally adulterated. Dr. Smart's recent investigations showing that they are generally as bad as in England before the passage of the Adulteration Act, as bad as human cupidity and rascality could make them. They contain not only fraudulent additions, but some of them positively deleterious or even poisonous ingredients.

The only safe way for the consumer, as in the case of coffee, seems to be the purchase of the whole or unground article.

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BAKING POWDERS.

This substitute for yeast or leaven in bread making, though in such common use with us, is almost unknown in Great Britain and on the continent of Europe, and before the Rebellion was but little known or used in the Southern States. In the latter, two forms of bread were in use, and that they were wholesome foods is abundantly shown by the superior stature, large, strong frames, and good teeth of the large population using them. The forms of bread alluded to are corn-bread made by baking a mixture of *white corn* meal, salt and water; the want of gluten prevents this bread from being light, but it is a very digestible and wholesome bread, notwithstanding, and the addition of eggs makes it not only light, but more palatable and nutritious.

The other form of bread is also an unleavened bread, but is made of flour, and was formerly almost universally used throughout the South. Its ingredients are flour and water, with salt, and a very small portion of lard, butter, or other shortening. Its most common name, beat biscuit, is significant of its mode of preparation. A batch of dough is first made with the shortening, flour, salt and water; this is placed on a firm surface, as a slab of stone or stout table, and while the dough is turned by the left hand of the operator, it is beaten with an axe or heavy club by the right hand, additional flour being added at every turn. When properly prepared and rightly cooked it is light and easily digestible; when broken it is of extreme whiteness, the manipulation it has undergone having filled the mass with air, somewhat after the fashion of bread, artificially aerated by machinery, which, at one time, was esteemed by many as more wholesome than ordinary bread swelled by the production of carbonic acid from fermentation by yeast. But as most of our people prefer the ready method of making bread by the use of baking powders, it is but fair that they should have them as pure as possible, or at least be aware of the more common adulteration.

The best baking powder (which, however, unfortunately, is not a powder) is a mixture of hydrochloric acid and carbonate or bicarbonate of soda, in such atomic proportions as to leave behind only chloride of sodium (common salt), but the fluid nature of one of its constituents renders it unfit for common use.

Another excellent baking powder seldom used, except for the preparation of some fancy varieties of bread, is the carbonate of ammonia,

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both of whose gaseous constituents are first evolved, and then finally driven off by the heat of baking.

As the carbonate or bicarbonate of soda is the alkaline basis of all common baking powders, we will first consider the commercial purity of this article.

In Diehl's Report on Adulteration of Drugs (National Board of Health bulletin, supplement No. 6), soda bicarbonas, both as produced in England and the United States, is rated as good.

Mrs. Richards (op. cit., p. 60), gives the following as the result of the examination in Boston of ninety-three samples, from thirty-five towns, twenty in packages, fifty-five in bulk, eighteen from known manufacturers. Of these, nineteen were nearly chemically pure; forty-three were good, making a total of sixty-two good; twenty-five contained from three to sixteen per cent of chloride and sulphate of sodium, but of these three only were bad. The common salt (chloride of sodium) and the sulphate are simply left in from the crude soda-ash in the process of manufacture; they are not added for adulteration. We may dismiss the soda without fear; nothing is cheap enough to be used for its adulteration.

Dr. Smart's report is not quite so favorable, but he says: "No markedly fraudulent adulterations were discovered, as with large percentage of terra-alba or starch; but it is probable that if the list of samples had been increased, some notably bad specimens might have been obtained, for in twenty-eight samples reported in the third annual report of the Health Department of the city of New York, while twenty-six were of the ordinary commercial character, one contained flour, and one nearly twenty-five per cent of terra-alba."

But when we come to the consideration of what constitutes (or is supposed to constitute) the basis of the other or acid ingredient of ordinary baking powders we, unfortunately, find a very different state of affairs.

Cream of tartar (both the home and the foreign product), the costly ingredient of baking powder, is described in Diehl's list (op. cit., p. 16) as always containing a small quantity of tartrate of calcium, and is very prone to sophistication, containing gypsum, terra-alba, amylaceous substances, alum, acid sulphate of sodium, etc., etc.; and as sometimes entirely artificial.

Mrs. Richards (op. cit., p. 61) examined in Boston one hundred and sixty samples, from forty towns, with the following result: Perfectly good, seventy-four (being fifty-eight per cent); containing more than

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three and less than ten per cent of impurities, fourteen; consisting largely of terra-alba, forty-seven; almost wholly of terra-alba, nine; largely of acid phosphate of lime, twelve; wholly of acid phosphate of lime, five; largely of flour, one (twenty-two counted twice as containing both acid phosphate and sulphate from 182—22=160); alum was not found in a single sample.

Dr. Smart (op. cit., p. 4) reports that eighteen samples of cream of tartar were examined, and of these only six were of satisfactory purity; eleven contained sulphate of lime (terra-alba), varying from seventeen to ninety per cent, three having nearly the latter figure; two contained no cream of tartar, but consisted instead: one of sulphate of lime, alum and acid phosphate of lime; and one of alum, acid phosphate and starch.

Considering the use of cream of tartar in baking, its impure condition is a serious evil. The condition of cream of tartar is bad enough, but in many cases the manufacturers of baking powders make bad worse by the addition of other adulterations.

The absolute value of a baking powder depends upon the amount of carbonic acid evolved, unfortunately there is no handy method of testing this, and price does not always indicate the value of any powder.

Baking powders are of three classes, according to the nature of the acid constituent, cream of tartar powders, acid phosphate powders, and alum powders, and should always be so labeled or marked; such is not the case, however, yet while some avowed acid phosphate powders may be found, there are no alum powders in the market.

Mrs. Richards (op. cit., p. 43) examined thirty-eight samples and found twenty-four good, that is, they contained nothing injurious, the worst adulteration being an excess of flour or starch over that needed for the mixing of the cream of tartar and soda. Of the remaining nine, eight contained alum, and five of these eight also contained ammonia (from ammonia alum).

Dr. Smart (op. cit. p. 4) examined eighteen specimens of baking powders (six of which were purchased and twelve furnished by the Commissary Department U. S. A.)

The acid salt of the latter consisted in every instance of cream of tartar. Of the purchased specimens one (1) contained alum, another acid phosphate of lime, while the remaining four (4) consisted of a mixture of these two salts. The alkaline salt was in all the bicarbonate of soda.

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DISEASES OF DOMESTIC ANIMALS

AND THEIR

RELATION TO THE HEALTH OF MAN.

PEPARED BY SPECIAL REQUEST

PROF. M. STALKER, B. SC., V. S.,

PROFESSOR OF VETRINARY SCIENCE IN IOWA AGRICULTURAL COLLEGE.

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DISEASES OF DOMESTIC ANIMALS AND THEIR RELATION TO THE HEALTH OF MAN.

To the Iowa State Board of Health:

GENTLEMEN—In answer to your request for some suggestions that may have been furnished by my investigations the present year, I send you the following hastily written sketch:

My college work has left me little time for anything outside of that which is necessarily connected with the course of instruction. With the exception of a few serious outbreaks of disease among domestic animals in different parts of the State, my observations have been confined to the class of cases to be seen in general practice. These have been sufficiently varied to possess some degree of value as matters for observation. To the student of comparative pathology these furnish an important field for investigation.

It requires no very profound research to discover the fact that we have, in this State, a large number of diseases among the domestic animals that stand in a more or less intimate relation to the health of the people. With the facts we already have before us on this subject, and the glimpses we are just beginning to get into the undiscovered fields, we have a very strong incitement to adopt measures of precaution.

ANTHRAX.

Many of these diseases we know to be directly communicable to man. When comparative pathology has reached the advancement that present indications give promise of, this list will doubtless be greatly extended, and it is certain that with the crowding together of large numbers of animals, and the adoption of highly artificial methods of keeping, the conditions for the development of disease are greatly enhanced. This is what will inevitably occur with increased population. The nature of the organisms that are the active agents in the production of some of these forms of disease, their transformations and subtile methods of transmission from one animal to another, is a broad field that is just opening to the view of the investigator. We have been accustomed to hear of *bacteria* all our lives, but not till the re-

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cent investigations of Pasteur, Buckner and others have we had but the vaguest notions of their life history or of their effects under modified conditions. If a few stalks of hay be taken at random from any of our stacks or mows and the same placed in a small quantity of tepid water and kept at a medium temperature for a few days, the liquid, when placed under the microscope, will be found to be swarming with minute organisms, among others the *bacillus subtilis*. This is a simple experiment that may be performed by any one possessing a good microscope. These organisms are destitute of virulent properties, and a draught of such infusion may be taken with impunity. Again, if we take a drop of blood from an animal affected with anthrax and place it under the microscope, we shall find that the liquid contains thousands of organized objects.

There is the closest resemblance between the bodies we have found in the two examinations. Here are two facts, neither possessing much significance if they stand alone, and have no relation whatever to other phenomena. But when we have gained the additional fact that these bodies are uniformly present in the blood of anthrax patients, and further, that the introduction of the smallest appreciable amount of this infected blood into the circulation of a healthy animal soon causes the blood of the inoculated patient to swarm with countless millions of identical beings, we begin to take additional interest in the subject.

Now, if we return to our infusion of hay, and inoculate a healthy animal with a drop of this liquid, it will be found to possess no septic properties whatever. Here is a wide range of difference between the action of the living organisms derived from the different liquids, when they are transferred to the circulation of healthy animals. Recent investigations however, have established a kinship between these two forms of life, that proves them both to belong to a family that kills.

While the *bacillus* from the hay infusion is found to be a harmless creature, yet, under certain carefully regulated conditions of development, it is found to acquire highly malignant properties. In fact, there is complete identity between the cultivated product from the infusion of hay and that from the blood of the anthracoid subject. This experiment of developing the *Bacillus subtilus* of hay into the *Bacillus anthracis* of the deadly anthrax has been successfully performed. This cultivated liquid has been used for experimental inoculations, and has resulted in the production of malignant anthrax.

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If a heavy fall of rain leaves surface-water standing on a meadow, and a few hot days immediately follow, a drop of this water will be found to contain germs identical with those obtained experimentally from the hay. It may be asked, Why, then, are these conditions not always followed by and outbreak of anthrax? It is only when the conditions are carefully regulated to the necessities of the case, that the innoxious germ grows into the malignant type of the fully developed organism. Nature does not always—nor even once in thousands of cases—furnish the continued succession of conditions necessary to perfect the changes.

A full supply of oxygen is destructive to the germs, and this is Nature's method of keeping in subjugation a part of her creation. These bodies assume an infinite gradation of activity just in proportion to the conditions furnished for their development. So they may become active agents in the disturbance of health without producing true anthrax. This fact has been taken advantage of in the cultivation of liquids, for the purpose of inoculation. Both Pasteur and Buchner have succeeded in the cultivation of liquids which, when used for inoculation, have produced but slight symptoms of the disease, and yet the animals enjoyed immunity from further attacks.

Again, it may be asked, Why are not these these outbreaks indefinitely extended when once the germs have attained to the height of their activity and are capable of reproducing their kind? Unfavorable conditions will so readily devitalize the active germs as they will produce the reverse changes. The conditions furnished by the circulating fluids of the body are probably the most favorable for the development of these germs. Here they are excluded from free contact with oxygen, yet there is sufficient to promote their rapid generation.

Though the circulating blood furnishes highly favorable conditions for their perpetuation, they will, nevertheless, retain their vitality for many years after they have been removed from the body. It has been shown that earth-worms can carry their living bodies from the graves of anthrax patients many years after they have been interred, and in this way cause an outbreak of the disease.

I have been consulted on several outbreaks of anthrax during the present summer. It is by no means an easy matter to determine the exact causes that have operated to produce these outbreaks. The heat and floods of the summer months have furnished highly favorable con-

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ditions for the development of anthrax germs. The heavy fall of rain may in some instances have percolated through the graves of animals that had died from the disease, and afterward found its way to the surface, charged with the poison. It will thus be seen that the opportunities for the spontaneous appearance of the disease are numerous, and that the immediate cause is often very obscure.

Hundreds of animals die every year in the State from anthrax, and doubtless many of these cases occur from the imperfect manner in which the former victims of the disease have been disposed of. The bodies should either be burned, or deeply buried where stock will not be allowed to go. The disease is communicable to man and other warm-blooded animals. A mouse inoculated with anthrax blood in the college laboratory, died in forty-eight hours, with manifest symptoms of the disease.

GLANDERS.

Glanders exists, or has existed during the summer, in several counties of the State. I have examined the stock in some of the infected districts. All the cases I have seen have assumed the chronic form, a type of the disease all the more dangerous, as it is far more likely to be mistaken for some other form of disease. Some of the affected animals have been doing regular work for a year or more, and all the while exposing men and other animals to the contagion. One of the misleading conditions of the disease is the fact that with the exception of symptoms that seem to be very trivial, horses may appear to be in the best of health, and do their regular work with no inconvenience. It is particularly fortunate that in this form the disease is not highly contagious, else incalculable damage would result from the spread of the disease. Glanders is actively contagious by inoculation. The contagium is volatile, and can be communicated to horses at a considerable distance. The disease is communicable to man by inoculation, and possibly by infection. In man the disease is characterized by the same symptoms that mark its progress in the horse. It is almost certainly fatal in the course of time, and every year adds a greater or less number of victims from the human family.

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TUBERCULOUS DISEASE OF CATTLE.

Tuberculous disease of cattle is another malady that is to be regarded with the gravest suspicion. Its history, symptoms and pathology simulate so closely the kindred disease in man as to leave their identity hardly problematic. The feeding of milk from tuberculous cows to small animals has in a number of instances developed in the latter well marked tubercles, with the accompanying symptoms of the disease. There is no good physiological reason why a similar experiment performed on a human subject would not be followed by similar results. A large number of cases have come under my observation, and the fact is evident that high-bred cattle are especially subject to the disease. The flesh and dairy products of tuberculous cows are to be strictly avoided as articles of food, as being liable to induce one of the most hopeless forms of disease, human consumption.

DIPHTHERIA AND TYPHOID FEVER.

The possible connection of garget with diphtheria is well deserving the attention of scientists. Typhoid fever is another disease that finds its victims among the lower orders of animals, as well as among men. The peculiarity of typhoid development renders the disease especially liable to be conveyed from the horse to man.

INFECTED MEAT.

Had I not already extended this paper beyond the limits I had intended, I would take pleasure in bringing to your attention some of the diseases that result from entozoa derived from the flesh of animals that furnish our great meat supply. The flesh of the swine, the ox and the sheep all contain the larva of parasites that in the mature form becomes the much dreaded tapeworm.

The *Trichina spiralis* is a frequent occupant of the flesh of the swine. I have had occasion to make examinations of some of the trichinous subjects. The life history of these entozoa is full of interest, and it is of vital importance that the masses of the people be better informed as to the sources of danger from them, and the precautionary measures to be pursued.

M. STALKER.

Iowa Agricultural College, Ames, September 27, 1881.

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SEWERAGE, DRAINAGE,

AND

DISPOSAL OF EXCRETA,

BY

JAMES L. LORING,

CIVIL ENGINEER IOWA STATE BOARD OF HEALTH AND CHAIRMAN OF COMMITTEE ON SEWERAGE AND DRINAGE.

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E WERAGE, DRAINAGE AND DISPOSAL OF EXCRETA.

To the President and members of the Iowa State Board of Health:

GENTLEMEN—Immediately after the designation, at the May meeting of your Board, of a committee on the preparation of a paper on "Sewerage, Drainage and the Disposition of Excreta," a large number of circulars containing questions which might have a bearing on these subjects were sent to the principal points of the State directed to physicians and other parties who were deemed to be interested in the general improvement of the health of the citizens of Iowa. A copy of such circular is hereto appended:

DEAR SIR—In the preparation of a paper upon Healthful Homes, for the State Board of Health, the Committee on Sewerage, Drainage and Disposition of Excreta is desirous of obtaining information upon the ollowing points, and will feel under obligations to those correspondents of the Board who will consider them and communicate with the committee:

1. What is the nature of the soil and the geological formation in your location?
2. What is the practice in your neighborhood in regard to the use of tile-draining the ground upon which the dwelling is erected?
3. What, in your opinion, is required to render a house and its surroundings healthful in your locality?
4. What has been your experience in regard to the location of dwellings in your vicinity as regards immunity of families from different forms of disease?
5. From what source do the inhabitants obtain their drinking water, and that used in cooking? If from wells, what is their average depth? In what manner are they constructed? Are they liable to receive surface-water?
6. Do the houses usually have cellars, and if so, are they walled with stone, ventilated, clean, and free from water?
7. What is the usual mode of disposing of the animal excrement, or fæcal and urinary matter?
8. What is the usual mode of disposing of the waste water and kitchen wash?
9. Please give your views upon any matters pertaining to the construction and maintenance of sewers and drains.

N. B. Please forward your reply within two weeks, if convenient, to

JAMES L. LORING,
Civil Engineer Iowa State Board of Health.

DALLAS CENTER, IOWA, May 20th, 1880.

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To these questions quite a number of answers have been received, and as they contain information from various portions of the State which may be of interest to those seeking locations therein, are made a part of this report and annexed thereto.

Although the circulars were sent to persons of different occupations, and presumably to those who were amply qualified to reply understandingly, yet it will be seen that the physicians alone have considered the matter as worthy of attention.

It is certainly a source of congratulation that those to whose skill are entrusted the care and welfare of diseased humanity and the care of results, evince themselves equally zealous in assisting in the prevention of causes. To all who have so kindly taken valuable time to answer the circulars sent to them your committe return heartfelt thanks. I am indebted to the engineer of Chicago, to whom a circular was sent, for some information, and under the head of "Sewerage" his answer to question No. 4, with some remarks thereon, is appended.

Believing that these answers are an average representation of the usual conditions throughout the State, this report will be confined to the consideration of "Sewerage, Drainage and Disposition of Excreta."

SEWERAGE.

Sewers are as old as the cities of the ancients. They were in use among people whose existence ceased centuries ago, and whose relics alone are the evidence of former human habitation. Beneath the ruins of Babylon, and the cities of Assyria, at Jerusalem and Rome, in Egypt, everywhere that the foot of the modern explorer has trodden, below the debris of centuries of destruction by war or time are found almost intact the great aqueducts, canals, conduits and sewers of nations whose history is recorded only in hieroglyphics, or altogether shrouded in the mists of antiquity. Even in America, among the traces of the deserted cities of the mound-builders, whose record not even tradition preserves, are yet found the remains of sewers. Wherever men have congregated in large bodies the absolute necessity of providing means to carry away the offal of daily life has evidently presented itself.

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EXPENSE OF SEWERAGE.

The present system of sewerage in the United States is yet in its infancy. One great drawback to absolute success is the expense. A city of ten thousand inhabitants recognizes the utility of sewerage and at a small outlay, which yet is considerable, taxes itself to build a sewer. Suddenly the city with the magic growth of the western continent has expanded to a metropolis of twenty thousand, and more sewerage is imperatively demanded. Before the old debt is paid, a new one must be contracted to suit additional wants. The extensions are made, and then it is found that the old main sewer is insufficient to carry away the extra volume. That which was ample for one is inadequate for two. Naturally, then, the question of finances must govern the construction and maintenance of sewers even more than any other consideration. The need of them has been demonstrated for untold centuries, and is beyond argument now. The city of Iowa desiring sewerage has only to arrange for the cost. Engineers are not wanting capable of constructing the work in accordance with the means furnished. The citizen of extensive reading advocates the cut stone cloacæ of Rome, or the rock-drilled drains of Jerusalem, but the conditions of our civilization preclude such works, as it is no longer in the power of one man to compel a nation's labor. It is apparently not difficult to raise money to build a railway or a factory, set afloat a line of steamships, or institute any one of the thousand sources of commercial prosperity or mercantile wealth. These undertakings all bear on their face plausible hope of remunerative dividend. The sewer, on the contrary, is literally buried capital, a source of expense rather than of income. Only when men are brought by actual experience to a realization of its desirableness as an institution paying its interest over and over again in removing causes of sickness, and returning the outlay in drafts payable in renewed health, exceeding in value the stocks and bonds of bank or railroad, is its necessity a recognized fact.

POSITION OF THE STATE BOARD.

In taking into consideration the construction of a sewer, when once determined upon, no absolute, definite rule *can* be given. It is not in the purview of this report to offer any plans which, however feasible and advisable in some situations, might be wholly useless elsewhere. It is to be presumed that the State Board of Health acts greatly

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in an advisory capacity, laying down no special dicta outside of the law creating it. Its fixed term extends over a period of years, and definite instructions can scarcely be expected on all matters coming within its cognizance until at least some portion of its time shall have been spent in making inquiry and making examinations, the result of which will render their suggestions valuable. To lead the people of Iowa to understand that, beyond merely living, it is desirable to live cleanly, and so secure the blessings of health, appears a needful step. More advanced and awakened public sentiment may demand more certain information. Thought once awakened will lead to wish to do, and competent instructors are never wanting when the demand exists.

SEWERS FOR DIFFERENT TOWNS.

The practicability and efficacy of a sewer, depends largely on the surface of the ground on which the city requiring it is built.

Evidently cities situated on broken ground, or with a river as its boundary, as is the case with many of the cities of Iowa, have had the question solved for them in advance as to the debouchment of the sewer.

But many inland towns, growth of railroad connections, are situated on almost level prairies, and have only small descent in any direction. To these, at some future day, will come the question of a sewer outlet. Of this, mention will be made later.

Further must be considered the present and prospective area requiring sewerage, the character of the soil, the average rain-fall, water supply, average amount of sewerage to each individual, and materials best adapted for building. These are all absolute conditions, and can only be determined by careful and intelligent survey. The soil may require, from its looseness, extra support, excavation may be difficult and costly.

THE MAIN SEWER.

Above all, the form of the main sewer, its internal and external construction, so that it may have a continuous fall and present no projection nor acute angle for the accumulation of heavy refuse, is an important item for study. The question for future utility and demand is an important one. A plan decided on to-day may not suffice to accommodate the increased growth of the population at the time of, or shortly after, the completion of the sewer. Every financial nerve should be strained for the beginning, and the sewer constructed of generous

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dimensions from its inception. If of brick, it should not be less than four and a half feet in diameter, and as much larger as possible.

SHAPE OF A SEWER.

It seems to be well established that the internal shape should be that of an egg, with its small end downward. This has the effect of deepening by contraction, the current at the lowest portion, and increasing the power of the water in washing away the sludge. As a natural consequence, the coarser offal sinks, and if the sewer is round or broad on the bottom, a deposit is formed over which the flow of water passes without having much power of removing the settlings. The egg shape permits the water to have the same effect as it would in a river where the banks contracting form a cañon.

MATERIAL FOR A SEWER.

Sewers have been constructed of many different materials; baked clay in rings, brick, artificial and cut stone, and iron pipes. Doubtless these last are really the best. Presenting a perfectly smooth inside surface, they are easily *flushed* by the introduction of streams of water, and not being porous are easier disinfected and less liable to accumulate gases.

The intercepting sewers are readily attached by flanged openings absolutely air and water tight, and the advantage of introducing the small sewers from the houses along its line by right angle connections, also secure from leaks, more readily attainable.

Brick must be laid in cement. The centers of the arch require constant setting and removal. Every inch of brick turned must be supported by solid benches, as the joints are continual. Every variation of soil at the bottom of the trench requires a different foundation. That which is ample in clay soils is not sufficient in quicksands. The joints of iron pipe being longer receive their supports sufficiently at their ends, and cannot sag in the middle. The requisite amount of excavation for a brick arch, with its supporting benches, is greater than an iron pipe. The pipe is more readily removed and is of some value if time demonstrates the need of a more extensive conduit. Brick once laid are of little use afterward if removed, and unless of an extra uniform hardness it is useless to employ them in underground works.

Stone is not desirable unless cut, and expense, as well as the fact that in much of Iowa stone is either a rarity or mostly a soft sandstone,

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precludes its use. Artificial stone pipe requires, or should have, as much support as brick work, and is also too porous and varying in density to make it a sure success for permanency.

VENTILATING SEWERS.

Another condition of valuable sewerage is some system of ventilation. This has been effected in many cases by open grates at the corners of streets, with a pool or box at the bottom of the sewer, where the washings of the gutters settle, and the water is useful in flushing the sewer. In such an arrangement, the amount of water likely to pass into the sewer from heavy rain-falls, must be taken into account. If the sewer is too small to carry the flood, back water is caused, sewerage is driven back, drains are choked up, and evil must result. The grating can be raised to clean out the box beneath. But this system is said to have pernicious effects. The meat in a butcher's shop, situated near one of these openings, has been found to be tainted by the escaping gases.

The method which will most certainly facilitate the escape of generated gas, is by the introduction of small pipes in the top of the sewer, leading them along just above the sewer, connecting several together, and at given distances permitting them to open either chimneys or ornamental iron street-pipes, running up high enough above the surrounding houses to allow the gas to escape without injury to anyone. This is an absolute essential. It is not the sewerage but the gas it generates by decomposition, that kills. The connection of the pipes from the houses into the main sewer should be carefully guarded. It may be made, of course, by small pipes adapted to the required amount to be removed. This connection should be made at a descending angle into the sewer, and at a right angle to it. There cannot then be any deposition caused by an eddy, which would certainly exist if the pipes entered the sewer at an obtuse angle. Examination will demonstrate this at the mouth of any of our water-courses. Added to the necessity of a careful connection between the house pipe and the main sewer, is the imperative demand for a "trap." These are of various forms, generally a direct and inverted U shaped bend in the pipe, which filling with water, seals the pipe so that the gas from the sewer cannot flow back. These traps are sometimes furnished at the bottom of the U bend with a plug which can be removed and the slit cleaned out. Traps are essential, and require care in the owner of the house not only to see that he gets the best of its kind, but that it is

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properly put in and kept clean. They are inserted at the outlet and beneath every sink and water closet in the house, and if in connection with them is attached a small pipe leading from them up through the chimney, or by passing outside the wall and there continued on above the building, the danger of gas accumulation is reduced to a minium.

THE TRAP SYSTEM.

The success of traps depends greatly on the plumber who puts them in, and only a thoroughly honest workman should be employed. They should be exhaustively tested, as on them depends the health of the household. Although no pungent gaseous odor is perceivable, still silently and without warning, the germs of disease from decaying organic matter, float out on the air and unconsciously breathed into lungs predisposed to weakness, do their deadly work. As stated above, the reply of Samuel S. Greely, Esq., city engineer of Chicago, to question No. 4, is inserted in this connection. It may serve to show that even knowledge and science are taxed in vain for a solution of the question of the avoidance of the deleterous effects of sewer gas. Mr. Greely says:

My house is a three-story modern house on stone basement, raised above the level of the street. It has two water-closets, three sinks and set basins, connecting with street sewer. The house is sunny, well warmed and ventilated. Opposite are some dozen poor tenement houses crowded together, standing several feet below the street, crowded with families and swarming with children. They have no sewer connections and use privies on the back of the lots. I have had in my house within the past four years three cases of scarlet fever, two of measles, and one of diphtheria, the latter and one case of scarlet fever being fatal. My water-closets and sewers are in good order so far as I can see. During the same time there has been but one case of serious sickness among the children of my opposite neighbors, and that was not fatal. I do not know how to account for this marked difference in health, except that my sewer connections caused it.

Mr. Greely's communication may serve to set others thinking who have had similar experiences, and show the absolute need of extraordinary care and watchfulness in the construction of sewerage traps and connections. We cannot ascribe the effects of our own carelessness to Providence, and wonder, that, surrounded with all modern conveniences, ourselves, our children sicken, and die, while those of our poorer neighbors grow and flourish. Dibdin sings:

"There's a sweet little cherub who sits up aloft
To watch over the life of poor Jack;"

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But it is to be presumed that if Jack did not keep a firm grasp on the ratlines no cherub's wings would suffice to bear him up. Any volatile oil such as turpentine, having a penetrating odor, poured into the uppermost sink or water-closet will betray below where any leak exists. If every joint is tight, and every trap perfect, no smell will be perceptible. But the oil will assuredly betray any rift where gas can escape.

THE PLACE FOR SEWER DISCHARGE.

Upon construction of the sewer the place of discharge is a question to be well considered. This has generally been effected in the nearest body of water. But contamination of the water rendering it unfit for use has been the result. In the cities of Europe large tanks have been constructed, into which the sewers empty; companies have been formed and by the use of charcoal, sulphates, limes, ashes, soil and similar substances, have utilized the deposit by manufacturing fertilizers.

It is yet a mooted, vexing question, what to do with sewerage. As our State becomes more densely settled, those who live on its rivers below the embouchure of city sewers, will certainly combine against poisoning of the waters, rendering them unsafe for the users.

It must sooner or later become imperative with inland cities to provide for the final disposal of their sewage.

The most effective way, probably, will be by the purchase of ground sufficiently removed from settlement, and the construction of reservoirs, and the utilization in some way of the sludge. London has over two thousand miles of sewer, costing over £30,000,000. These are led to the distance of seven to eight miles, emptying into enormous reservoirs, the sewage being partly removed by the tide and partly manufactured. Paris has over two hundred and fifty miles of magnificent sewers, through which boats can pass, which empty into the Seine many miles below the city.

Both of these are the growth of seven or eight centuries, and are not adduced either as standards of comparison or as subjects of rivalry for the newer cities of our State. Their experience, however, can be made use of to aid in construction, and, if on an humble scale, their improvements and advantages be guides for the future.

What is done hereafter can be done in the light of past days, and works important to the health of generations yet unborn should be

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done on as generous a scale as possible, and under the supervision of men of tried and acknowledged ability.

One thing is evident, the officers of our cities must make up their minds that expense is a concomitant of successful sewerage, and consideration of profit, pecuniarily, well nigh barred. Health alone can be aimed at, and minor matters set aside.

DRAINAGE.

Next to sewerage in cities, is the drainage of country districts. This returns a direct percentage on the investment, and farmers of Iowa are fast discovering the fact and rapidly deciding for themselves. They soon learn that the low lying lands on the open prairies are rich in all the constituents of crop wealth.

Draining is no longer experimental, but a regular well established business. Experienced hands go from farm to farm putting in tile drains, and the open ditch is fast becoming a thing of the past. Everywhere drain tile factories are sending out their products, and cannot keep pace with the demand. A short time ago anything, no matter how rough, was used as a drain. To-day tile are made as truly and evenly and burned as well as they were in potter's kiln, and the sale of them is reaching enormous proportions. They are made with both round and oval openings from two to eight inches in diameter and twelve inches long, costing from 30 cents to $2.50 per rod.

A trench is dug averaging four feet in depth, wide enough to lay the tile in. (There is a peculiar style of spade manufactured for this purpose, allowing just enough of dirt to be removed.) Into this ditch the tile are laid, simply abutting one another, and the ditch re-filled. The drain lasts as long as the tile remain, and every inch of the ground above it can be worked.

There are farms in Dallas county which a few years ago were dotted with unsightly ponds covering acres, homes for frogs, breeding places for mosquitoes, and prolific of fever germs. To-day, by a judicious system of drainage, these have become smooth, fine farms, and the drained land the richest of them all. The main drain is generally a large pipe, numerous small drains converging into it. The outlet forms a spring of water ample for large herd of cattle. Such an one is on the farm of John D. Whitman, Esq., in Dallas county, and suffices for his herd of thorough-breds. A neighbor of Mr. Whitman has put in this year nearly two and a half miles of tile, and reports the cost at about twenty dollars per acre for land reclaimed. But he

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considers it money well spent. A few crops repay all outlay; his farm can be all cultivated, and he has removed a source of nuisance which had doubtless been the main cause of the diphtheria which deprived him of one of his little ones.

Much has been done, yet much remains undone. Any physician who has a country practice in the newer districts of Iowa, knows that the well from which the water in use at the house is drawn, is only a hole three or four feet in the nearest slough or pond hole.

Water impregnated with the decaying vegetation of the rank grasses, and drainage from hog lots and barn yards, is in daily use on many a Western farm. The physician who is called to remedy the effects of this evil should urge and insist on the digging and walling of a well in some situation remote from such contamination.

Many farmers spare neither time nor expense in securing drainage for their farms. Sometimes a willful, obstinate neighbor impedes their efforts. Too lazy or indifferent to copy a good example, Mr. B. tells Mr. A. he cannot carry his drain through Mr. B's field, and in the absence of direct legislation, which in the interests of general health the Board ought to be empowered at any rate to recommend, Mr. A. is debarred from completing his work, and lives in a state of armed neutrality with his neighbor, Mr. B.[1]

If every farmer or dweller in the country would see to it that his house is built high enough above the general level of the farm, or land, to admit of drainage; stop digging a hole, without wall or drain, and dignified as a cellar, under his house, to fill up with water, rotten vegetables, and all uncleanness, breeding all the evils in Pandora's box, there would be fewer little ones, and a smaller percentage of larger ones to carry out and cover under the daisies. "The Lord giveth and the Lord taketh away," be it said in all reverence, but the hole under the house has something to do with it.

The millenium of cleanliness is only attainable by each man doing what common sense tells him he should do. No law can accomplish it. Legislation never washed a man's face, or drained his cellar. All that can be done is to point out the necessity, and urge for a constant improvement.

Some of the genial editors of Iowa are asking for what purpose is

(1) Sections 1207-1227, Code of 1873, recite the necessary forms of procedure where open ditche, are to be cut, and properly guard by stringent rules the construction of such. But an undergrounds covered drain cannot be injurious to any one, and the permission to construct one through adjoining land, should be legally fixed, without the routine prescribed for open ditches.

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the State Board of Health. Is it not sufficient if they can only act as sign posts to indicate the road to Sanitation? If one follows the designated road, another takes courage, and then another, until the contagion of example forms a nucleus around which gather all the sanitary interests of the State. Out of a multitude of counsellors some stray beams of wisdom are evoked, and time brings knowledge.

"Rome was not built in a day." The man who has lived filthy all his life will scarcely be brought to a realizing sense of his shortcomings by a single session of the Board of Health. If the labor is vain and comes to naught, probably the pay is commensurate.

DISPOSITION OF EXCRETA.

In all cities where an ample sewerage system prevails, the disposition of excreta is of course provided for as a general arrangement. Connected, however, with many dwellings in the suburbs of cities and in our towns as well as with isolated country residences, some method is adopted for the disposal of the excreta of the indwellers. In the largest majority of cases this is merely a cheap wooden privy, sometimes vaults, but more often not, and a glance at the alleys and courts of nearly all the towns of Iowa, is sufficient to substantiate this statement. The idea seems to be, it matters little what kind of, or how arranged a building, one should have for the use of the family. Anything which may serve as a temporary shelter from public observation, erected as cheaply as it is possible to construct, and probably roofless and a door with or without hinges, as it may happen. These are either set on top of the ground or mayhap a few inches of dirt are thrown out, and without wall or curb this is used for as many years as possible as a cess-pool for a dozen or more persons. Regardless of odors scarcely emanating from Araby the blest, day after day these receptacles of accumulated filth are visited by men and women, without a thought of inconsistency in comparison with the over-fastidiousness they display in all matters pertaining to personal adornment, and in affairs of social life. This is a delicate matter to call one's attention to personally, but closely connected as it is with the sanitary suggestions which rightfully come within the domain of the Board of Health, it seems appropriate to first call attention to the evil before suggesting a remedy. Not only do we find these privies in such an uncleanly state, but we also find them in our closely built towns in clusters nearly proximating one another, filling the air with unhealthy gases and impregnating all the

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surrounding soil with their poisonous emanations. If this were all, some method might be devised of remedy by constant attention to deodorization. But near to these sinks one may count from one to half a dozen wells which furnish the water supply of the neighboring houses. A large portion of the State of Iowa, especially all its prairie region, is a porous upper soil, from five to ten feet deep. Underlying this is the commonly called blue clay, totally impervious to water. This upper soil is in the nature of a sponge, absorbent in any direction, up or down or sideways. The accumulated debris of uncounted centuries of decayed vegetation ever untilled has formed a soil, somewhat peaty in its nature, which absorbs readily as by capillary attraction the water from the clouds and atmosphere, and in dry weather sucks up the moisture which settles down next the clay. Although the effect is to nourish vegetation and give to Iowa a soil prolific of cereal luxuriance, still the fact must be recognized that this ability of the ground to absorb moisture from any direction, should be considered when privies and wells are in such close proximity as in most of our towns.

REMEDIES SUGGESTED.

What method can be best adapted to render these receptacles of excreta most innoxious?

A few suggestions present themselves:

1. In the South it is usual to see the privy so arranged that the contents may be readily removed every day or two from the rear. In many hotels, where sewerage does not exist, large tubs are placed beneath the seats, and frequently removed and emptied, dirt having first been thrown over the contents. This method is only open to the objection of finding those who are willing to do such work, those engaged in it at the South being the colored people who have been accustomed to the work, and are insensible to its unpleasantness. Of course no vault is needed by this method. Similar systems are in use in Germany.

In Holland the vaults are emptied by means of machinery centrally situated. A vacuum is created and the contents drawn up into great tanks and manufactured into poudrette for manures. In many of our eastern towns there are doors to the vaults, especially where they can be built on a side hill, and the contents removed by men who make a business of deodorizing the excreta and mixing with dry earth and other substances. Since this is a business and constantly followed, it

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must be remunerative. But whether on the broad prairies of Iowa, with their almost inexhaustible fertility, such an industry would be as profitable as in the Eastern States with their numerous market gardens and stony soils, time alone can determine. The removal of human waste in this manner during the hot months would be far preferable to allowing it to accumulate so as to offend every one.

2. One system of construction, although a little expensive, yet of small cost in comparison with the added comfort and freedom from long time accumulations, suggests itself:

Wherever there is a chance of underground drainage without causing injury to others, first dig a vault four feet deep of the length and half the width of the privy, say six feet by two, then dig another of same dimensions except not exceeding two feet deep in rear of the first one, forming a pit six feet by four feet with a step; line this with brick or wood curbing, on four sides and in front of the step; then when the privy is built over it, set the same only over the deeper part of the vault, leaving the shallow pit open behind the building; from the front underside of the seat bench put in a sloping partition extending down to the front of the shallower pit; this partition should be made of narrow boards or slats, leaving openings of half an inch or so between; extend the partition the whole length of the privy; two or more ditches are then dug, somewhat lower than and leading from the lower vault, of any length, radiating like the sticks of a fan and running in any desired direction; place in these, drain tile of two or three inches in diameter, and cover them up. Have a ventilator or wood chimney, run up from the lower vault and extending above the roof of the building. The rear vault may be covered with a sloping door, which can be readily raised. In a privy so constructed, nearly all the solid matter would pass into the rear vault, and the fluid portion flow into the lower one, and be drained away. A bucket of warm water, in which a few ounces of sulphate of zinc had been dissolved, poured on the sloping partition occasionally, would keep it free and clean, and act as a disinfectant and deodorizer. The solid excreta deprived of moisture loses its unpleasant odor in a very short time, and if the bottoms of the vaults are slightly sloped in the direction of the drains, the liquid is quickly disposed of. An occasional sifting of fine dirt over the contents of the rear vault, which is easily done by raising the door, will complete the absorption, and the contents can be removed without offense. Two or three neighbors might combine

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in the construction of such privies, one system of drains being sufficient for all.

3. It is to be supposed that care will be taken to lead the drains sufficiently far and in a direction away from any well. For farm or country houses no better method could be devised, as there is generally some meadow or field into or beneath which the drains could be led.

In addition to these suggestions are the advertised earth closets, which are certainly desirable where there are invalids confined to the house.

CONCLUSION.

In conclusion it is only necessary to remark, that some definite series of experiments under skilled directions, is the sole way to demonstrate how to render innocuous in the shortest possible time, the waste which nature compels so constantly. Isolated experiments are confined to a limited area. The party making them does not desire to incur the necessary expense of making the result known, in order to benefit a wide circle.

Public sentiment scarcely authorizes the discussion of such a subject in a newspaper, and it is only through a Board of Health and its reports that many delicate subjects can be presented to the consideration of the citizens of Iowa. The mere thought of the fact of imperative daily demand should, however, be sufficient to impress every one with the absolute need of accomplishing the functions of nature in the most convenient way, and with due regard not only for cleanliness, but the consequent health of ourselves and those who are neighboring to us.

Local sanitary boards are in no wise justified in being mealy mouthed, or from considerations of friendship, refrain from calling any one's attention to the slovenly, dirty condition of the privy, rendering it unhealthy, a source of disease to owner and neighbor, and an eye-sore to every lover of neatness.

So accustomed have we all become from habit to these blots on the landscape, indifference has become the rule. The privies of our school houses are proverbial for their chronic uncleanness. We educate our children in costly edifices in all those studies which tend to instruct and expand the mind, not neglecting hygiene, and annihilate the theory of this last by a practical neglect of one of its most important requirements.

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It is time to awake from apathy. School boards, sanitary boards, and citizens whose influence is potent in their vicinage, should not only raise their voices, but by act and deed remedy this evil. Then instead of unsightly, filthy out-houses, which one dreads even to pass, there will be erected places made respectable by care and attention, and free from the accumulation of horrors which render them so fearful now.

Respectfully submitted,

JAMES L. LORING,
Civil Engineer Iowa State Board of Health.

CORRESPONDENCE.

REPLIES OF DR. H. H. CLARK, OF M'GREGOR.

1st. *The geological formation belongs to the lower Silurian.

a. The lowest or base rock here is the *Potsdam sandstone*, a loose friable rock, at places being nothing more than loose sand.

b. Above this sandstone lies the lower *magnesian* limestone, a finely jointed rock.

c. Above the magnesian limestone is the *St. Peter's sandstone*, a rock of the consistency of the Potsdam sandstone, but as a rule somewhat harder.

d. Above the St. Peter's sandstone lies the *Trenton* group of limestones; these are also jointed, and have many layers of slaty limestone, which are impervious to water to such a degree that it gives rise to many excellent springs along the hill-sides where it crops out.

e. Above the Trenton group is the drift, which consists chiefly of sand and clay deposits. No gravel.

f. In the valleys are alluvial deposits consisting of a rich mould; clay or sand is present, according to situation.

All the rocks in this vicinity, with the exception of a few thin layers in the Trenton group and in the lower magnesian limestone, are easily traversed by water—the limestone on account of its many joints, and the sandstone on account of its being poorly cemented.

The economic value of the rocks is not great. The St. Peter's sandstone is used somewhat for making glass. This immediate vicinity furnishes sand for the Rock Island glass works. The limestone used for lime and for building purposes, with the exception of a few hard layers, is too soft for fine work.

No fossils in the magnesian rocks, nor in the sandstones. Many in the layers of the Trenton limestones.

2d. The city of McGregor is located between bluffs on the Mississippi River, extending back from the river about one and a half miles. Sewers have been constructed in all the streets, communicating with a large sewer which empties into the river. The drains from most of the dwellings empty into the sewers.

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* The figures beginning paragraphs refer to questions in circular on page 295.

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3d. Proper ventilation and cleanliness about the premises.

4th. I have been a resident of McGregor ten years, during which time we have not suffered greatly from epidemic diseases, except cerebro-spinal meningitis during the winter of 1872-3, hence I can in a general way say that our sanitary condition is good.

5th. Our inhabitants obtain their drinking water and that used in cooking from cisterns. We have a few wells, averaging, perhaps, twenty-five feet in depth; drilled; they are liable to receive surface water, and the water in consequence is not generally used. We have one artesian well; depth, two hundred feet.

6th. The houses usually have cellars with stone, well ventilated, clean and free from water.

7th. Vaults—the board of health of this place see that the vaults do not become a source of filth.

8th. Conducted into the sewers by drains.

Respectfully submitted, H. H. CLARK, M. D.

McGregor, Clayton county, June 7, 1880.

REPLIES OF DR. E. M. REYNOLDS, OF CENTERVILLE, IOWA.

1. The soil of Appanoose county is a brownish, clay loam, largely intermixed with clay in many localities, tempered with sand sufficiently to aid in the speedy absorption of water. The surface soil is of variable depth—on the broken lands very thin, but on the level portions or slightly rolling, which greatly predominates, the soil is uniformly deep, ranging from six to twelve inches. The substratum is nearly pure clay, called hard-pan, which holds the water for a considerable time. A great portion of the county is destitute of rock, only on the white oak lands does it crop out, and then only where the coal lies near the surface; limestone predominates.

2. Tile drainage is unknown, almost, here for any purpose. No building sites are improved by its use, much to the detriment of the health of the people by its non-use.

3. Almost everything is wanted here to make our dwellings healthful. The practice obtains here, almost universally, to build the house, where even the site is chosen, regardless of hygienic principles; no drains, no grading, sanitary rules are universally ignored; but am happy to note that the more able are now doing better in constructing their dwellings and securing drainage, especially for their cellars and basements. But those building tenement houses, or owning them, for the purpose of renting them, disregard all sanitary laws. I hope this terrible source of disease can be removed by strongest enforcement of the law.

4. I find that families living in houses with good rock foundations, floors well above the ground, with good circulation beneath, with surrounding ground sloping sufficiently to carry off surface water, are rarely attacked with malarial troubles, especially here in Centerville, as our location is a high one and generally free from malaria.

5. Three-fourths of our people, at least, obtain their water used for drinking and cooking from wells. Their average depth is probably twenty-four feet. They

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are usually walled with stone, and no precaution to prevent their receiving the surface water, other than banking up for a few feet around.

6. Few houses have cellars under them, simply because they fill with water unless drained; many of our houses have cellars that stand half full of water half the year. Ventilation of cellars is sadly neglected here only in few instances, and I know of no cellar or basement that is ventilated as it should be; decaying vegetables can be found in the majority of them till late in May, usually.

7. Our privies are usually in bad condition, they are simply repositories of filth with a vault dug in the ground, usually not walled. I know of no privy that is drained.

8. The waste matter is usually thrown in the back yard.

9. In my opinion, sewerage, to make it efficient, is going to be the hardest thing to introduce on account of the necessary expense to secure it in a town like ours. We need a sewer entirely around the square, with a covered drain discharging far out of town. Sewers should be constructed along all the streets, so that every cellar in town could be drained easily, and at the same time facilitate tile draining. Surface drains should be constructed on each side of the street, protected by substantial curbstones. This expense, I am afraid, will cause a sad neglect of one of the greatest sanitary measures that claims our attention. I am glad that we have been so fortunate as to secure your valuable services in this matter.

Pardon me for sending this meager report.

I am yours, and truly,

E. M. REYNOLDS.

Centerville, Appanoose county, May 26, 1880.

REPLIES OF DR. C. C. PARKER, OF FAYETTE, IOWA.

I have the honor to acknowledge receipt of circular of inquiry concerning the hygienic factors in this locality and respectfully reply to your questions as well as I can briefly, in their consecutive order:

1. The soil is generally a dark, rich loam. In some neighborhoods clay preponderating; in others sand. Geologically we are on the dividing lines between the Devonian and Niagara formations of limestone; the latter being cut through and exposed at many points by our very crooked stream (the Volga) giving great diversity to the surface and much variety to the soil and subsoil.

2. In the village or city of Fayette no tile drains are used, and none are needed. To the south and westward, where the Devonian clays form the subsoil, drains are frequently needed, and occasionally tiles are used. More frequently, however, the drain is boxed with boards for a short distance from the cellar, and the remainder left as an open ditch.

3. The question is too general for a concise answer; I should say the same as in any other locality. It should be comfortable, of sufficient size, dry and well ventilated, and stand upon dry and open ground, and away from the vicinity of stagnant water (of which we have none except mill-ponds).

4. My experience is, that dwellings situated on the open prairie are much less liable to malaria and typho-malaria, than those in or about the borders of dense groves or upon the river bank. Further, my experience is that dwellings situated

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upon the highest lands where the supply of drinking water is most liable to fail, are soonest affected with epidemics of specific character, such as true typhoid or enteritic fever, also epidemic dysentery; and perhaps I should also say diphtheria. The altitude in itself not being the cause of disease only so far as it increases the difficulty of securing pure water.

5. The majority of the inhabitants obtain their drinking water from wells—very many, however, from springs. The depth of wells varies greatly; in some neighborhoods from ten to twenty feet. In Fayette, twenty to eighty feet; on the hills surrounding, fifty to two hundred feet. Of the shallow wells, some are open dug wells and walled with stone; some are driven wells; some are bored and curbed, and some are bored and left without curbing. Of the deeper wells, most are drilled in the rock (usually seven-inch drill), but some are bored to more than one hundred feet and curbed either with galvanized iron tubing or with wood.

6. In Fayette, and its immediate vicinity, the houses all have cellars, walled with stone; generally ventilated, clean, and free from water. In some situations on the prairie west and northwest, cellars are wet, unless drained. Some are not walled with stone but either planked up, or are mere holes dug under the house.

7. Usually deposited in privy vaults.

8. Dishwater with kitchen garbage goes into the swill barrel and mixed with corn meal, oats or ground feed; fed to pigs or to milch cows. Soap suds is usually poured around raspberry or other garden shrubbery; sometimes upon a compost heap for manure, or into a cess-pool; sometimes, however, like the water from the common wash-basin, it is simply thrown out the back door.

9. Have no experience with sewers as to their construction. Think they should be large, with as rapid and uniform descent as possible, and empty into as rapid a stream as possible far below their origin.

Very respectfully,

C. C. PARKER.

Fayette, Fayette county, June 21, 1880.

REPLIES OF DR. A. A. NOYES, OF MASON CITY, IOWA.

1. Soil is of a clay loam, with magnesia limestone underneath all, extending for a number of miles around.

2. Every house, where there is the least danger of water in cellars, I believe every one, has proper drainage. Although we are on high ground, no town has, I think, better natural drainage in the State than ours.

3. Good ventilation for buildings, care for keeping streets and alleys clean, with care to personal cleanliness; no danger in this locality. I have been practicing here for nearly eleven years, and somewhat extensive, and have yet to see the first epidemic of any description, in this part of Iowa.

4. In this locality, I see no reason to refrain from building dwelling or business houses in close proximity to each other, and in so doing use, as I do, pure cistern water, well filtered through brick; charcoal will do. Our whole country being underlaid with limestone, makes the well water very hard, and of course unhealthy for drinking, for either man or beast.

5. Principally water from wells is used, for drinking and cooking. They are not

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liable to any surface water, with any decent or proper care; they are drilled from twenty-five to fifty feet, into solid limestone rock, and this rock juts out in some places in this immediate locality. In my cellar (for instance) the rock was from three to six feet under the surface, being quite irregular in its formation all over this country.

6. Most of the cellars are in the rock, they having to be blasted out to get them, as in my own case, and walled with stone, generally well ventilated, and free from water. And one thing it may not be out of place to mention here, and that is this, notwithstanding the rock cellars, etc., I have seen some cellars during or at the termination of a heavy rain, a great deal of water in them, but in a very few houses, all nice and dry. So it will be noticed particularly, that water cannot stand in any of our cellars, but a very few hours.

7. I believe all vaults are dug to the rock, the bottoms being dry as the cellars, all excrement, also from families, being deposited in them pretty generally, I believe, and still no water in them.

8. The waste water, etc., generally thrown upon the surface of the ground, I think, and leached, or carried away.

9. Where there is no natural drainage, I think it very necessary that proper sewers should be constructed and maintained, and in conclusion—would it not be advisable to have a health officer appointed by the State Board, in every city of suitable size, to look after such things?

Respectfully submitted,

A. A. Noyes, M. D.

Mason City, June 10, 1880.

REPLIES OF L. A. MERRIAM, M. D., OF CRESCO, IOWA.

1. The soil in this section is a rich black loam, varying in depth from one to three feet, beneath which lies from four to ten feet of earth or drift, and beneath this, to the north, the lower Silurian rock which crops out in the hills and bluffs of the Upper Iowa near the north boundary of the State. To the south and west lies the upper Slurian rock which crops out along the Turkey River.

2. No tile drains are to be found in this part of the State. Drainage here is very good, due partly to the elevation of Cresco, eight hundred and thirty-six feet above Keokuk, and one thousand two hundred and eighty feet above the sea level; and also to fissures and small caves in underlying rock.

3. Nothing special is needed. Many houses in Cresco have too much shrubbery, and too many trees around and near the house, obstructing the sunlight and rendering the house damp and unhealthy.

4. Nothing.

5. All drinking water is obtained from wells of an average depth of about twenty to forty feet. This is used for cooking purposes also, and is of excellent quality, though hard water. The wells are bored into the limestone rock and are not liable to receive surface water except as it filters through the soil, for the well is tubed or curbed down to the rock.

6. Most cellars are walled with stone, and under most houses are well venti-

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lated, clean, and, until this season, generally free from water. Nearly every house in town now has water in the cellar, and I have no doubt sickness will be the result.

7. Privies have all excavations to receive urinary and fœcal matter, and frequently in too close proximity to wells. Manures are carried to the fields, and barn-yards are not kept as clean always as they ought.

8. Waste water and kitchen wash are most generally poured into a great excavation which has been filled with cobble-stone, and is usually termed the slop hole. Some of these are from six to eight feet deep, and frequently too near the well. In some cases, and too frequently, the back alley receives the slops of all kinds, and refuse is allowed to accumulate to the extent of becoming a nuisance.

9. None to offer.

L. A. MERRIAM, M. D.

Cresco, Howard county, June, 1880.

REPLIES OF DR. E. H. WILBER, OF ROCKFORD, IOWA.

1. Drift formation overlying rock, drift, thin rock coming to the surface occasionally. Drift, gravel and clay, covered by sandy loam. Rock—light-gray limestone. Elevations and depressions comparatively slight. Valleys of streams not much lower than adjacent uplands, although defined in places by well-marked bluff lines and limestone ledges.

2. No tile draining.

3. Cleanliness and sunshine. Are too prone to plant groves close to and all around the buildings to the exclusion of sunlight and good air.

4. Have noticed nothing striking.

5. From wells. In valleys open and from fifteen to twenty feet deep. On uplands drilled usually from top of ground, and tubed with galvanized-iron tubing, and from thirty to eighty feet deep. Surface water well kept out.

6. Mostly have cellar, but very indifferently constructed.

7. In privies and on river banks.

8. Throw it out the back door.

9. Have not given the matter enough study to express an intelligent opinion.

E. H. WILBER.

Rockford, Floyd county, June 15, 1880.

REPLIES OF DR. W. L. M'ALLISTER, OF NEW SHARON, IOWA.

1. Soil is a deep, black loam.

2. Very little tile draining, sloughs drained by open ditches.

3. House should always be kept clean and well ventilated, from cellar to garret, and surrounding grounds constantly divested of all decaying animal and vegetable matter.

4. I have not a satisfactory answer to give.

5. From wells; average depth perhaps eighteen to twenty feet, usually walled with brick or stone, with wooden pumps; a great many receive the surface-water.

6. A large proportion of houses have cellars walled with stone or brick; some

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of them are kept clean, well ventilated and are free from water; a great many are neither clean, ventilated, nor free from water.

7. A shallow vault or pit under an ordinary privy receives the animal excrement.

8. Waste water is usually thrown out at the nearest place convenient.

Yours truly, W. L. McALLISTER.

New Sharon, Mahaska county, June 6, 1880.

REPLIES OF DR. C. REITERMAN, OF LE GRAND, IOWA.

1. Sandy loam: limestone foundation.

2. Tile draining not practical in this vicinity.

3. Pure air, sunlight, and freedom from stagnant water, decomposing vegetable and animal matter, etc.

4. Those whose dwellings are on high, dry locations are generally healthiest. Low, marshy regions near Iowa River subject to malarious diseases.

5. Wells, average depth twenty-five feet probably, walled with stone, and generally pretty well protected against surface drainage.

6. Yes. Walled with stone; free from water; ventilated perhaps generally; imperfectly and reasonably clean.

7. Privies; with usually shallow vaults. Barn manure is usually used to enrich the soil of farms.

8. Some throw on ground, some give to hogs, etc.

Yours faithfully, C. REITERMAN, M. D.

Le Grand, Marshall county, June, 1880.

REPLIES OF DR. N. L. KEAN, OF NORTHWOOD, IOWA.

1. Our town is situated on the east bank of the Shell Rock, and some thirty feet above it, at the average water mark. The town plat is nearly level, with good drainage toward the above stream. Geologically the soil formation is first a black loam from two and a half to four feet in depth; underlying that a bed of gravel from three to ten feet deep, depending upon location; following the gravel from above down we next come to a dark blue clay, about a foot in depth; then sand for some distance, followed by a deep, yellow clay of various depths.

2. There has never been any tile draining here; what draining we have is merely gutters on the road-side, built in such a way as to carry the surface water toward the stream.

4. There has not been an epidemic of any disease in this neighborhood for eight years. Last fall I had a number of cases of typhoid fever eight miles south. Every house was built on high land, but had water in the cellar and fungoid growth on cellar walls. These wells were from eight to twelve feet deep. The water in this town is obtained from wells, stoned walls, with pumps; average depth, twenty feet. They do not receive surface water unless built on low ground.

Fœcal matter and urinary matter are generally deposited in privy vaults. Waste water and kitchen wash are generally thrown into a drain carried to a large barrel sunk into the ground.

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I have thus briefly attempted to answer your questions, which should receive more attention than I can at present give them. The subject is an important one, and to the Board should be given power to dissipate prevailing ignorance on those subjects, should instruct the laity, and the profession as well, concerning ventilation, drainage, sewerage, food and drinks; pointing out to them that the germs of many deadly diseases, while never produced by filth, are often transplanted to it; that they breed and flourish in it, and are decimated by it. It should be the further duty of this Board to teach that the xymotic diseases are preventable, and should be abolished, and that the continuance of these diseases should imply not ignorance alone, but criminal neglect.

Very respectfully yours,

N. L. KEAN.

Northwood, Worth county, June 10, 1880.

REPLIES OF DR. W. C. COLEMAN, OF DECORAH, IOWA.

1. Clay and sandy loam, Trenton limestone with fossils.
2. Not used.
3. Cleanliness is all that is required in the city.
4. In low places malarial fever and phthisis (tubercular); the reverse inelevated.
5. From wells mostly, and three kinds; viz,—Drilled, average depth, 65 to 70 feet. 2d. Excavated and walled with stone. 3d. Driven. None are much liable to receive surface water.
6. Yes. Many are not well ventilated. Few dwellings have not cellars, but one-half the store cellars are wet.
7. Common small privies. Vaults three or four feet deep.
8. Generally thrown into the alleys, which are not drained.
9. Were it not for the natural drainage; viz.,—Upper Iowa and Dry Run, our sanitary condition would be bad. This being an elevated location, were it not for the cost, deep under drains to sewers would be far preferrable.

W. F. COLEMAN, M. D.

Decorah, Winneshiek county, June, 1880.

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SMALL-POX HOSPITAL.

PRINTED BY ORDER OF THE

STATE BOARD OF HEALTH.

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DESCRIPTION OF PLATE I.

Fig. 1. Front elevation.

Fig. 2. Plan of main floor, with an arrangement of five or seven beds for each ward.

Fig. 3. Plan of basement.

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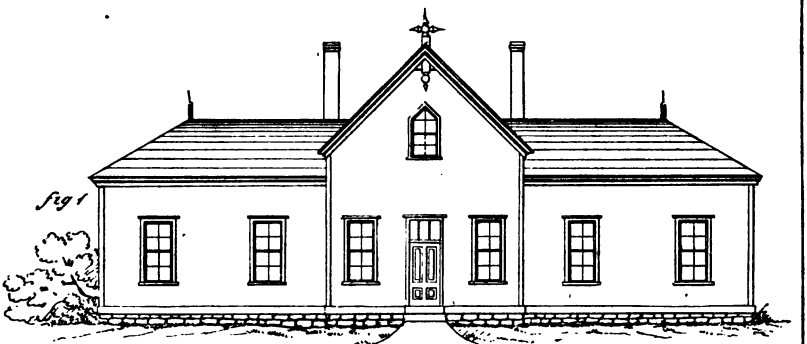
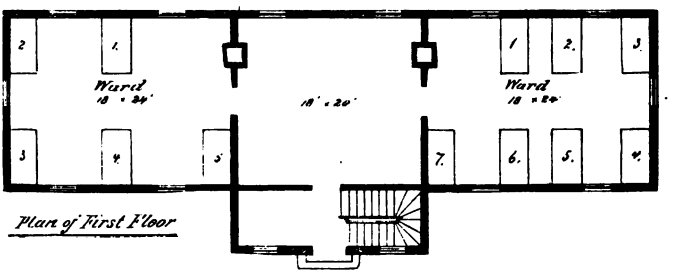
Proposed Plan for a Small-pox Hospital.

fig 1



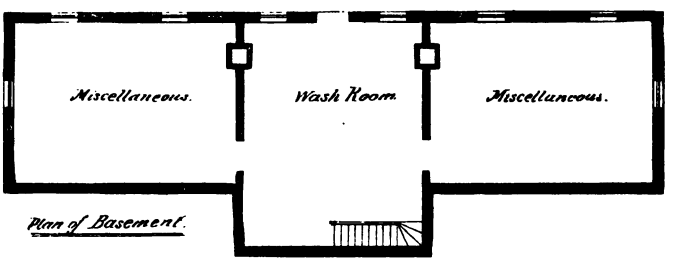
Front Elevation.

fig. 2



Plan of First Floor

fig. 3.



Plan of Basement.

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DESCRIPTION OF PLATE II.

Fig. 1. Rear elevation.

Fig. 2. Plan of attic room.

Fig. 3. Section (diagram) of a Galton fire-place (with blower applied), and chimney, (from Putnam's, "The open fire-place in all Ages.")

A. Duct for entrance of fresh air.

P. Iron pipe, leading from the throat of the grate to the flue above.

C. Ceiling.

F. Space behind grate, where, and at the sides of the grate, and around the iron pipe, the air in its ascent is heated.

R. Register or opening, just beneath the ceiling, through which the heated air enters the ward.

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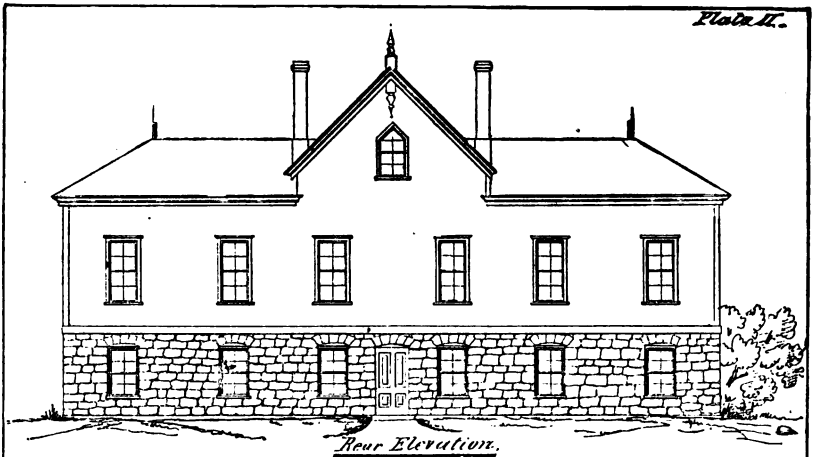
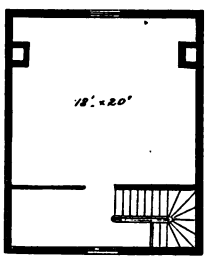
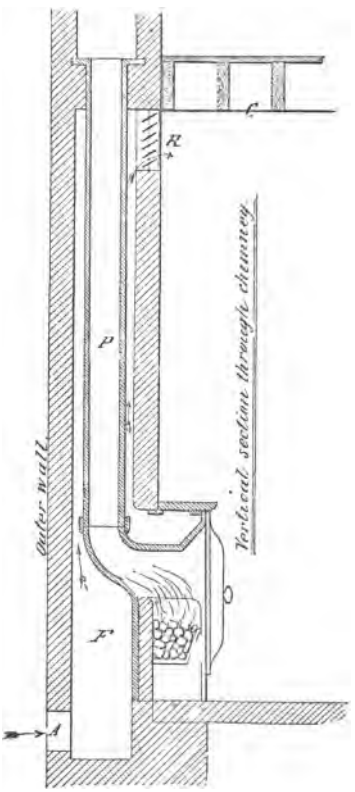
Plate II.



Rear Elevation.



Plan of Attic-room.



Proposed Plan for a Small-pox Hospital.

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SMALL-POX HOSPITALS.*

The construction and equipment of hospitals is the province of a branch of sanitary science, and of this branch I have selected a portion; viz., that of small, or as they are now commonly termed, cottage hospitals, having special reference in the treatment of the subject, to the use of these small hospitals as small-pox hospitals or pest-houses, or, avoiding those old-fashioned and apparently objectionable names, and adopting a recently recommended euphemism, hospitals for the the treatment of contagious and infectious diseases.

The origin and growth of small hospitals are exceptions to the general rule of the development of the great from the small, for the large hospitals came first and have existed for many centuries, whereas small or cottage hospitals are the product of the last three or four decades.

The great hospitals sprang from the church, and were at first and for a long time afterward devoted to the care of the old and helpless, as we would now say, asylums, and were, some of them, at least, devoted to the care of sick and wounded in comparatively modern times. Some of those enormous establishments still exist, being found in Rome, Naples and other cities of Italy.

The year 1859 saw in England, at Cranleigh, the birth of the first cottage hospital, a lapse of fifteen centuries since St. Jerome used the word "nosocomian" for an institution which must have then existed.

I will not waste the valuable time of the society by attempting to describe the various forms of cottage hospital which have been erected in Great Britain and America; nor is it deemed necessary to dwell upon the important items of site, material, etc. A few remarks may, however, be permitted on the advantages of small hospitals, and more especially of that variety of them peculiarly devoted to the treatment of contagious and infectious diseases.

The general advantages of small hospitals, beside the great one of being comparatively, if not entirely, free from the vice of hospitalism,

*From a paper read before the State Medical Society at its annual meeting January 25, 1882, by R. J. Farquharson, M. D.

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so graphically and eloquently described by Sir J. Y. Simpson, are the following:

Affording as they do a home-like refuge for the poor, in cases of sickness and accident, they are not regarded with that superstitious dread, amounting almost to horror, with which all great hospitals are generally invested by the imagination of their intended inmates.

Persons treated in a well-conducted small hospital are actually surrounded with more comforts, more care and more cleanliness than are to be found in the homes of most people, for it is a lamentable fact that most private dwellings, even those of the better class, abound in unsanitary surroundings. But it is when a small hospital is used as a pest-house, *i. e.*, for the seclusion of those sick with infectious or contagious disorders, that its great excellence becomes apparent.

If every person over the age of one month was properly protected by vaccination, as they should be in every civilized community, and as they would be in the Utopian city of Hygeia, there would not be a particle of use or necessity in isolating a single case of small-pox; however this place might be advantageous in regard to scarlatina, measles, diphtheria, and perhaps other diseases.

Unfortunately, however, there are in all communities in this country a number of unprotected, or improperly protected persons for whose safety isolation of small-pox cases is necessary.

What great assistance in stamping out small-pox and kindred diseases the complete isolation afforded by a small hospital lends, is shown by the following quotations:

No sane person doubts that the provision of adequate hospital accommodation for such cases is, in the end, by far the cheapest and most effectual course for the local authorities to adopt. Experience abundantly proves this.

Dr. Buchanan has shown the value of this ready-made provision for infectious cases by recording the results of establishing a small-pox hospital at Cheltenham with fourteen beds.

During six months of the year 1875, small-pox was brought into Cheltenham, no less than six times, from Gloucester, Birmingham, Liverpool and elsewhere. Seven persons ill of the imported disease were taken without delay to the hospital, and, except one individual (who was also removed to the hospital), nobody in the town caught the disease from these centers of contagion.

Dr. Wilson says:—At Hastings small-pox epidemics have been twice stamped out. At Bristol, on many occasions, epidemics from various infectious diseases have been averted, and probably one of typhus in 1877.

At Newcastle on-Tyne typhoid fever (once epidemic) has several times been completely stopped.

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At Leet, in Staffordshire, no case of small-pox occurred after removing the first to the hospital.

At Coventry small-pox has been stopped twice, and scarlet fever on many occasions. At Ipswich, in 1877, small-pox was imported into the borough no less than twenty (20) separate times without once getting a foothold.—*Burdett, Cottage Hospitals, 2nd ed., Phila., 1881, pp. 265 et seq.*

All this evidence comes from England, but had we such carefully prepared statistics of small hospitals in America, which unfortunately is not the case, there is little or no doubt but that it might be duplicated here.

Another and a great advantage of a ready-made small hospital for contagious diseases, is on the score of economy, and from experience, I am fully satisfied that no outlay of public money will yield a greater return in the long run. As an illustration, I may be allowed to quote the following brief chapter of my personal experience.

In 1873, the city of Davenport and Scott county were without a proper hospital for infectious and contagious diseases; upon the outbreak of the cholera, the usual senseless panic occurred, and though the epidemic only lasted a very short time, over $2,000 of public money was expended (the most of it wasted), an amount, as will be seen further on, almost sufficient to build the efficient hospital now in existence.

This brings me now to the proper subject of this paper, which is to demonstrate by example how a small hospital, especially adapted to the treatment of small-pox, cholera, scarlet fever, measles, diphtheria, or any other contagious or infectious disease (and which may be, and is, used for other purposes), may be erected upon a safe and suitable site, and for a comparatively small sum of money.

The use of the word safe, in reference to the situation of the hospital, does not refer, as it might seem at first sight, to the isolation of the building, for, in my opinion, a very slight separation from other houses is necessary, but to the protection of the hospital from destruction by fire; for, strange to say, pest-houses, although isolated from all other buildings, and not in any way peculiarly exposed to the action of the elements, are of all others, in my experience, the most liable to destruction by fire. The neighbors, not near ones, of almost every building used as a pest-house, think it no crime to apply the torch of the incendiary to the humble structure.

This had been the constant experience in Scott county, each suc-

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ceeding year bringing its quota of detached cases of small-pox, the advent of each creating the ever-recurring panic, with its search for a new pest-house, and the inevitable big bill of expenditure for nurse-hire, provisions, transportation, etc., amounting in some cases to hundreds of dollars.

Tired of this state of affairs, the supervisors of Scott county and the Mayor and council of the city of Davenport, entered into a contract with the Mother Superior of the Sisters of Mercy, at Mercy Hospital, for the care and treatment of all such cases of small-pox, and other contagious diseases, as might in the future be admitted into that hospital. The agreement in brief, striking some details, was as follows; viz.,

Lease of ground for twenty-one years; city and county may renew the lease, or may remove the building, having twenty days to do so.

Compensation: Three ($3.00) dollars per day of twenty-four hours, *provided*, that when any patient shall be provided with medical attendance by second party (the Sisters), then the sum of five ($5.00) dollars per day [in addition to the said three ($3.00) dollars] shall be paid for said medical attendance. That said five ($5.00) dollars additional shall at no time be paid for more than two (2) patients at a time; but such additional sum of ———, not to exceed in any one case more than four ($4.00) dollars per day, shall cover all charges for medical attendance; and in case there is one or more such patients in said hospital, then a male nurse is to be furnished by the first party (city and county), as above stated.

Bedding, etc., to be cleaned for future use, if practicable, to be furnished by the city.

A joint appropriation of $2,500, by the supervisors of Scott county and the Mayor and council of Davenport, was then made for the building and equipment of the said hospital.

I drew the plans of the building needed, and these, after their approval by the Medical Board of Mercy Hospital, were followed in the construction.

A fine site was found, sufficiently near the main hospital for convenience of attendance and administration, and for the protection of the building against incendiarism; and sufficienty remote to afford ample protection to all parties. This site was on the declivity of a hill, but near the summit, thus affording excellent drainage, both surface and otherwise, and, as will be seen from the accompanying plates,

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having all the well-known advantages of a hill-side barn. After making the excavation, it was tile-drained, and a drain of broken stone put just outside of the foundation wall, on three sides; this wall is of stone (ashler), but the division walls of the basement and the chimneys are of brick.

The upper structure is of wood (frame, with tarred paper under the weather-boards), and the whole building has a total length of 70 feet, with a width of 20 feet in the wings and of 26 feet in the central portion, this projecting six feet, thus affording a hall or vestibule, which contains the stairs ascending to the attic, and those descending to the basement. These are all inside measurements.

The wings have a height to the eaves, in front of 12 feet, in the rear of 20 feet, and to the ridge (from the top of the basement wall), of 20 feet; the central part has a height to the eaves of 18 feet, and to the ridge of 29 feet (from top of basement wall). There are twenty-four windows, fourteen of which have eight (8) 14x20 panes of glass; eight (in the basement) have eight (8) 14x14 panes, and the remaining two, those of the attic, smaller ones. The fourteen windows of the main floor are all provided with weights and pullies, and, also, with inside shutters, which are not painted, but varnished.

The whole wood-work had two coats of paint, and the floors of the wards and of the central room, after being oiled, had three coats of paint.

The ground floor, which is entered from the rear by a door one or two steps above the ground, contains three rooms, two end ones of 18x24 feet, and a central one of 20x24 feet; the two former are not floored or otherwise finished, but it was intended, at some future time, to erect a bin at the end of one for the storage of dry earth, to be used in the earth-closets, with which the wards are provided; and, also, in a convenient corner, near one of the chimneys, a chamber for the disinfection of clothing by dry heat.

The central room is intended for kitchen and laundry, being supplied with water from a cistern, a pump, a sink, cooking-stove and appliances. It was floored over, but this was a mistake, the flooring should have been of concrete, which laid over a drained surface makes the best floor for such a room.

In the lower corner of the hospital lot, which is enclosed by a board fence, a small privy is built, over a vault provided with an over-flow pipe leading further down the hill, and into cultivated ground; into this vault or cesspool all the waste water is led.

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As there is no other water supply than that afforded by the cistern, water-closets were out of the question; however, a very cheap and efficient substitute was found in the Wakefield earth-closet, one of which was placed in each ward.

In the attic is a room of 18x20 feet, separated from the head of the stairs by a landing. There is here sufficient lodging room for two or three attendants. On the main floor is the main room, reached by a small flight of steps from the ground level in front, through a hall or vestibule 6x20 feet. This room needs no particular description, being furnished with a table and a few chairs, and may be used as a dining, sitting or convalescent room.

Coming now to the essential part of the structure, we have two wards of 18x24x10 feet; each ward has a door leading from the central room, and five windows, with one so situated that either five or seven beds (see Plate I, Fig. 2), may be conveniently arranged. This would seem at first sight to limit the maximum capacity of the hospital to fourteen beds, but when we treat of the peculiar mode of ventilation used, it will be readily seen that at any emergency this number of beds may be safely increased.

The walls of the wards, after having been plastered and hard-finished in the usual manner, were tinted of a delicate shade of color, pleasant to the eye.

Before applying the last coat, I made a most diligent search for something to produce an impervious and glass-like surface, visiting several newly built hospitals for the purpose, but in vain. The best that can be done with such walls is to frequently scrape and whitewash them; but I am satisfied that the proper wall, especially for a small-pox ward, is one with a surface impervious as glass, which should be kept constantly moistened with a dilute solution of glycerine, thus catching all germs, debris, epithelial scales, pus corpuscles, indeed all solid particles, and preventing their rebound into the air-space of the room; at intervals, the crop of contagious particles thus gathered might be wiped off with sponges and destroyed.

The wards are heated by Galton fire-places or grates, one of which is placed at the rear end of each ward, in the division wall. Now, these fire-places will not heat the incoming air more than 30° or 40° Fahrenheit, and are, therefore, in very cold weather, to be supplemented by stoves, holes and thimbles for the pipes of which are placed in the chimneys; but for eight months of the year the heat afforded by the Galton grates would be sufficient.

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Now, I may here pause to remark, one of the great beauties of this system of ventilation, which is that, no matter how close, on a cold winter night, the nurse may make every crack or crevice, where fresh air might enter, as is their wont, or how red-hot he may make the stove, the proper ventilation of the ward will proceed as long as any fire is kept up in the grate, which the attendant is always likely to have for his own greater comfort, and the increased convenience of boiling water, making tea and other drinks over an open fire. Finding (in 1876) no Galton fire-places were to be had in this country; I procured two made in Cincinnati, which answered the purpose very well; I may here remark, in passing, that Galton grates and an excellent American modification of them may now be had in New York. These grates are built into the chimney (see Plate II, Fig. 3)—this is a very delicate job and requires an expert in the building of fire-places and chimneys—and are of iron, but have a lining of fire-clay. From the throat of this grate an iron pipe (see Plate II, Fig. 2 P.) rises some ten (10) feet, (just above the ceiling C), terminating in a flue, which runs the remainder of the chimney, and should terminate in a cap (but does not in the present instance).

The air, admitted from the outside at the base of structure A, is warmed by contact with the heated sides and back F of the grate, then after being still further heated by surrounding the iron pipe in its ascent, is delivered into the ward from a lowered opening or register R, placed just beneath the ceiling C. The end rooms of the ground floor being vacant and unused, the air is taken at present from them, but in case of their occupation, it would be necessary to lead a pipe outside (see Plate II, Fig. 3 A).

I have purposely left the subject of ventilation to the last, as the most important, the most essential feature, the *sine qua non* of good hospital construction.

On this subject Dr. Elisha Harris says (Public Health Reports, volume 1, page 114):

> At his side stand the masters in hygiene and surgery, and in the words of John Simon, all unite in the statement that, "So thoroughly does a hospital depend for its usefulness on the capacity of its wards for the most exquisitely perfect ventilation, that in all plans of hospital construction this is the one cardinal virtue to be insisted on. The ventilation must be such as shall leave no corner unsearched by its current."

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Surgeon Billings, U. S. A., in his "Notes on Hospital Construction" (Public Health Reports, volume 2, page 386,), says of the Galton fire-place:

If carefully made and adjusted, such a fire-place (a double one) has been found by experiment to satisfactorily heat a room of 48x25x12 feet, and to ventilate it at the rate of 40,000 cubic feet of air per hour (*i. e.*, to renew the air of such a room every twenty minutes), the external temperature being at the freezing point.

Another author says:

The open fire-place (he is speaking of the common open fire-place, and his remarks apply with double force to the Galton, which not only removes the foul, but brings in fresh air,) sweeps the air of the room by removing 12,000 cubic feet per hour (he is speaking of a small room), every portion of which is charged with organic debris of every kind, from the inert particles of the floor, bedding and clothes, to the epithelial scales, and pus corpuscles, the carriers, it may be, of actual contagion.

It is customary to speak of allowing 1,000 cubic feet of space to each patient, but if the air is renewed as contaminated by respiration and transpiration, 300 cubic feet per hour would suffice.—*Billings' Notes on Hospital Construction, Public Health Reports, vol. 2, p. 387.*

Our ward of 18x24x10 feet would give a cubic space of about 4,000 cubic feet (4,320), which, for five persons would give a cubic space of 800 cubic feet of air, and a square surface of 86 square feet to each; but, as will be seen below, the air would be renewed five (5) times per hour, or every twelve (12) minutes.

Captain Galton's estimates are as follows:

Size of the room being	6,357 cubic feet.
Air changed per hour	31,784 cubic feet.
Requiring sectional area of smoke-pipe	140 solid inches.
Requiring sectional area of cap-pipe	70 solid inches.
Requiring sectional area of fresh-air flue	400 solid inches.

Now, if these elements are preserved in the construction of the ward (and they are, excepting the chimney-cap), it would give just 20,000 cubic feet of air renewed per hour, and the cubic contents being 4,000 cubic feet, would make five times per hour, or every twelve minute, as stated.

Ridge ventilation of the wards was not attempted, and for the following reasons: In our climate it is impracticable in winter; it is always under the control of the nurse, who invariably closes it when

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most needed, *i. e.*, at night; and, finally, in summer it is not needed, for the end and side windows would give ample ventilation, if there was any wind blowing, and, if the air was calm, a small fire burning in the grate (with the air-duct closed) would soon renew the air.

Not having the bills at hand, I cannot state exactly what each item cost, but the total expenditure was $2,500. This included the whole outlay for the building, painting, plastering, plumbing, the purchase of a cooking stove with the necessary kitchen utensils (including a large boiler), tables, chairs, twelve iron bedsteads with beds and bedding, and, finally, the erection of two lightning-rods made of three-fourths-inch iron rods welded together (planted each in a small well reaching to the wet subsoil and filled with powdered coke) and reaching some distance above the top of each chimney.

I have thus attempted to show how a small hospital in every way adapted to the treatment of cases of small-pox, or of any other contagious or infectious disease, may be constructed at a comparatively small cost.

This plan of a small hospital is not presented as a model or typical one, but merely as a suggestion, in the hope that it may stimulate and in some degree assist in the erection of some such hospitals in various quarters of the State, where, as every one must admit, they are very greatly needed.

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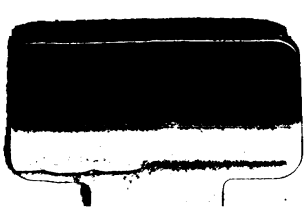

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